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Review of the rove beetle species of the subtribe Gyrophaenina Kraatz (Coleoptera, Staphylinidae) from New Brunswick, Canada: new species, provincial records and bionomic information

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Abstract

A comprehensive species review of the genera *Gyrophaena* Mannerheim and *Eumicrota* Casey is presented for New Brunswick, Canada. Twenty-four species of *Gyrophaena* are reported from New Brunswick including two new species, and two species of *Eumicrota*. Nineteen previously described species are newly recorded in New Brunswick, eight of which are newly reported in Canada. New species are: *Gyrophaena meduxnekeagensis* Klimaszewski & Webster, **sp. n.**, and *G. pseudocriddlei* Klimaszewski & Webster, **sp. n.** New Canadian records are: *G. chippewa* Seevers, *G. corruscula* Erichson, *G. dybasi* Seevers, *G. fuscicollis* Casey, *G. illiana* Seevers, *G. involuta* Casey, *G. laetula* Casey, and *G. lobata* Casey. New records for New Brunswick: *G. fuscicollis* Casey, *G. caseyi* Seevers, *G. chippewa* Seevers, *E. corruscula* Erichson, *G. criddlei* Casey, *G. dybasi* Seevers, *G. flavicornis* Melsheimer, *G. gaudens* Casey, *G. gilvicollis* Casey, *G. gracilis* Seevers, *G. illiana* Seevers, *G. involuta* Casey, *G. laetula* Casey, *G. lobata* Casey, *G. sculptipennis* Casey, *E. socia* (Erichson), *G. subnitens* Casey, *G. uteana* Casey, and *G. vitrina* Casey. All species are documented by colour habitus images, black/white images of genital structures, and distributional maps. All female genital structures are presented and illustrated here for the first time. A key to the New Brunswick species is provided.

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Keywords
Canada, New Brunswick, new species, rove beetles, *Gyrophaena*, taxonomy, bionomics, distribution

Introduction

Ashe (2001) recorded 62 valid species of *Gyrophaena* from America north of Mexico. The genus is very poorly known in Canada and the only key to identification of species was provided by Seevers (1951) in his North American revision published over half a century ago. This outstanding contribution requires updating, particularly at the specific level, for the Canadian fauna. Moore and Legner (1975) recorded 13 species from Canada and none from New Brunswick. Campbell and Davies (1991) listed 20 species of *Gyrophaena* and one of *Eumicrota* for Canada, and 5 species of the former genus for the province of New Brunswick. Ashe (1984) published a thorough generic revision of the subtribe Gyrophaenina with a review of described subgenera but it lacked species level treatment. Here we present the first comprehensive species review of the genera *Gyrophaena* and *Eumicrota* from New Brunswick, Canada. We report 26 species including two new species, 8 new national and 19 new provincial records. There are now 29 species of *Gyrophaena* and two species of *Eumicrota* known to occur in Canada, considering new data provided in this contribution, and records provided by Campbell and Davies (1991) and Dollin et al. (2008). Intensive collecting of aleocharine rove beetles in New Brunswick since 2004 by the second author (RPW) has yielded many new species, and new provincial and national records. These records will be published in a series of papers. The goal of the present contribution is to describe two new species, publish new collection and bionomic data on *Gyrophaena,* and to provide a revised key for the identification of species.

Method and conventions

Collection method. Various kinds of mushrooms and forest litter were sifted using the method described by Smetana (1971) and other methods described below. Specimens of *Gyrophaena* are easily collected from various kinds of mushrooms by breaking the mushrooms into pieces in a plastic box and then collecting the beetles as they move. This was the primary method employed for collecting most of the specimens reported in this study.

Specimen preparation. More than 300 adult specimens of *Gyrophaena* were examined and most specimens were dissected. The genital structures were dehydrated in absolute alcohol and mounted in Canada balsam on celluloid microslides and pinned with the specimens from which they originated. The photographs were taken using an image processing system (Nikon SMZ 1500 stereoscopic microscope; Nikon Digital Camera DXM 1200F; and Adobe Photoshop software).

Terminology mainly follows that used by Seevers (1951) and Ashe (1984). The ventral part of the median lobe of the aedeagus is considered to be the part of the bul-

bus containing the foramen mediale, the entrance of the ductus ejaculatorius, and the adjacent venter of the tubus; the opposite side is referred to as the dorsal part.

Distribution. Distribution maps, created using ArcMap and ArcGIS, are presented for each species recorded in New Brunswick. Distribution of each species in Canada and Alaska is noted. New provincial records are indicated in bold. The following collection abbreviations are employed in the text:

AFC	Atlantic Forestry Centre, Fredericton, New Brunswick, Canada
CBU	Cape Breton University, Sydney, Nova Scotia, Canada
CGMC	Christopher G. Majka collection, Halifax, Nova Scotia, Canada
CNC	Canadian National Collection of Insects, Ottawa, Ontario, Canada
JOC	Jeffrey Ogden collection, Truro, Nova Scotia, Canada
LFC	Laurentian Forestry Centre, Quebec, Quebec, Canada
NSMC	Nova Scotia Museum, Halifax, Nova Scotia, Canada
RWC	Reginald Webster collection, Charters Settlement, New Brunswick, Canada

Results

Twenty-six species of *Gyrophaena* are now known to occur in New Brunswick (see the checklist) bringing the total number of all aleocharine species known from the province to 175 (Klimaszewski et al. 2009; Webster et al. 2009). Two of these species, *Gyrophaena meduxnekeagensis* Klimaszewski & Webster, sp. n., and *G. pseudocriddlei* Klimaszewski & Webster, sp. n., are described as new to science, 19 species are newly recorded for New Brunswick, and 8 are newly recorded for Canada. One species, *G. meduxnekeagensis*, is added to the Quebec staphylinid fauna. Collection and bionomic data for all species are presented in the bionomics section of each species account and in Appendix 1.

Species Review

Aleocharinae

Tribe Homalotini Heer, 1839
Subtribe Gyrophaenina Kraatz, 1856

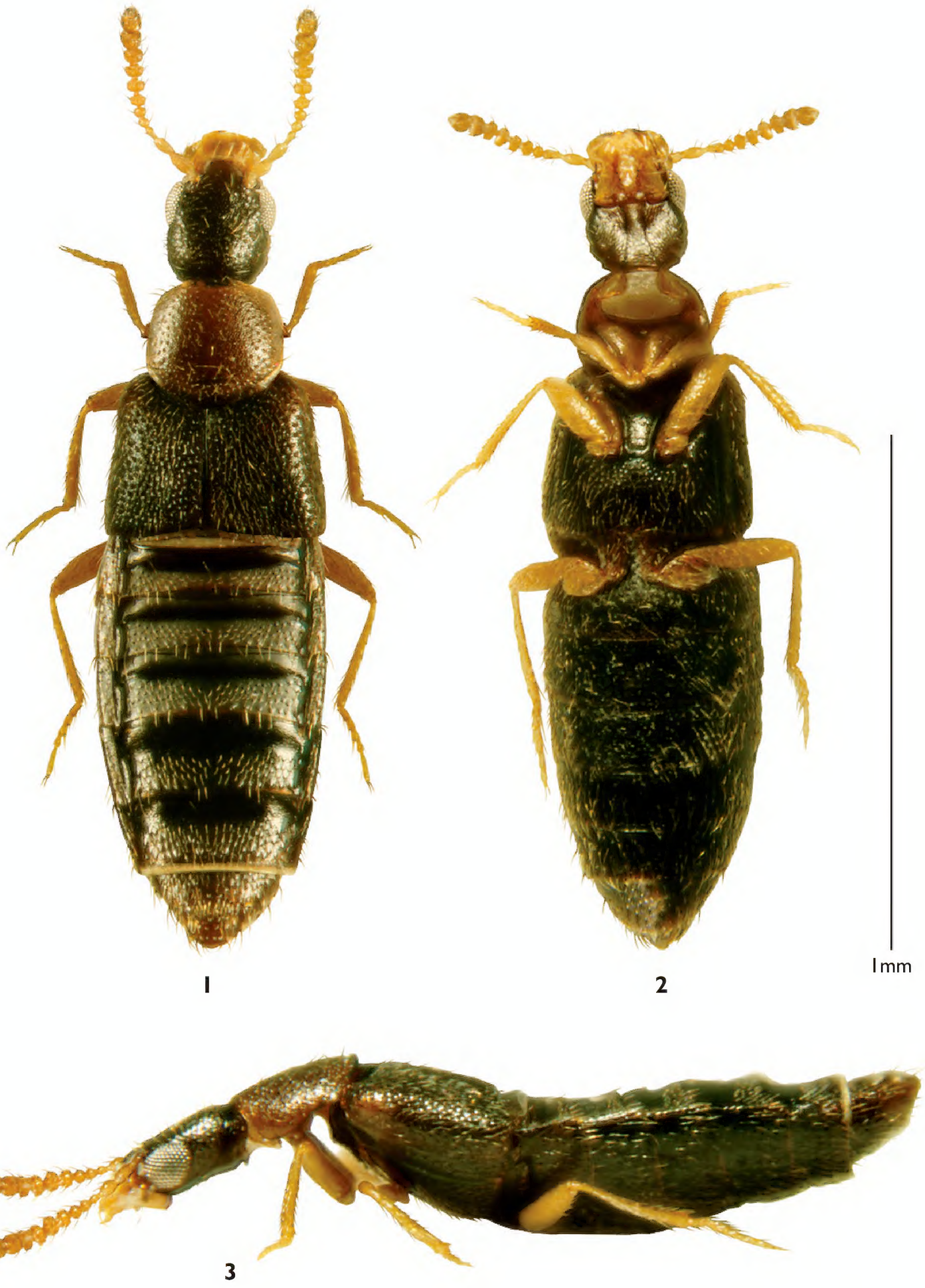
Genus *Gyrophaena* Mannerheim, 1830

Figs 1–205

Gyrophaena Mannerheim, 1830; Casey 1906; Fenyes 1918; Seevers 1951, 1978; Moore and Legner 1975, Ashe 1984, 2001. Type species: *Staphylinus nanus* Paykull (=*G. nana*).

Description. Body small, length 1.2–3.5 mm, broadly oval and dorso-ventrally flattened (Figs 1–30); coloration flavate, brown, piceous, or black, usually bicoloured but sometimes uniformly coloured; integument of forebody with approximately uniformly distributed microsetae and enlarged macrosetae in large insertion pores, often elevated (asperities), forming distinct patterns on pronotum and head; isodiametric meshed microsculpture usually present; head with well-developed temporal region; infraorbital carinae present; eyes large and often prominent, finely faceted and broadly separated; labrum broadly oval or trapezoidal with sensory setae forming patterns (Ashe 1984); mandibles robust, the right mandible bearing one, usually well-developed internal tooth, and a well-developed internal membranous lobe (the prostheca), which bears rows of small dents or teeth (Ashe 1984); maxilla: lacinia obliquely truncate and with numerous closely spaced teeth (spore brush), and rows of setae on the outer lobe, galea provide a cup-like cap over the apex of the lacinial comb, which probably helps retain food scraps from mushrooms (Ashe 1984); ligula short, entire, produced and broadly rounded at apex; antennae with 4th article small, 5th slightly broader than 6th, 4–10 usually incrassate (Figs 1–30); pronotum usually transverse with hypomera visible from the side; mesocoxae broadly separated (Fig. 2); elytra usually broad-shouldered (Figs 1–30); abdomen tapering apically; mesosternal process truncate apically and at least as long as metasternal one; spermatheca sclerotized, with a lateral plate-like flange on the short stem, capsule spherical (Figs 36, 43, 50, 61, 68, 75, 82, 93, 104, 115, 122, 129, 136, 149, 156, 163, 170, 177, 189, 196, 203); median lobe of aedeagus variably shaped, often tubular or trough-shaped and with either ventral projections of various shapes and sizes forming a complex structure (Figs 89, 96, 100, 107, 111, 118, 125, 132, 139), or without the aforementioned (Figs 32, 39, 46, 53, 57, 64, 71, 78, 85, 139, 145, 152, 159, 166, 173, 180, 184, 192, 199); apical portion of internal sac rigid and forming elongate projection from where flagellum is normally exerted, the internal sac unlike most other aleocharine genera, lacks internal and external spines and sclerites; paramere with broad apical lobe bearing four setae, usually two longer and two shorter ones (Figs 33, 40, 47, 54, 58, 65, 79, 86, 90, 97, 101, 108, 112, 119, 126, 133, 140, 146, 153, 160, 167, 174, 181, 186, 193, 200); male tergite 8 usually with two relatively large lateral teeth and smaller apical teeth in median part of apical margin (Figs 34, 41, 48, 55, 59, 66, 80, 87, 102, 109, 113, 120, 127, 134, 141, 147, 154, 161, 168, 175, 182, 187), rarely larger lateral teeth are reduced and smaller median teeth are lacking (Figs 73, 194), or lateral teeth are transformed into large lateral lobes (Figs 91, 98, 102, 109, 120, 127); species strictly associated with mushrooms. The species groups in *Gyrophaena* are mainly defined based on similarities of the median lobe of the aedeagus.

Bionomics. Adults of *Gyrophaena* are obligatory inhabitants of fresh mushrooms where they feed, mate, and lay eggs on fruiting bodies, and their larvae must mature before the fruiting body decays (Ashe 1984). *Gyrophaena* species occur on fleshy and woody polypores, boletes, and fleshy gilled mushrooms, and are very abundant on the latter (Ashe 1984, 2001). We have observed adult *Gyrophaena* in rotting (early stages of decay) and dried mushrooms but in much smaller numbers than in fresh mushrooms. Mushroom habitats have several unique attributes: they are ephemeral, unpredictable



Figures 1–3. *Gyrophaena* (*Phaenogyra*) *gracilis* Seevers: **1** dorsal view **2** ventral view and **3** lateral view.

in time and space, and extremely heterogeneous in physical and chemical characteristics (Ashe 1984). Adults of gyrophaenes have developed adaptations to find and live on desirable mushrooms. The principal structural adaptations of the adults are modi-

fications of their mouthparts. The beetles feed by "grazing" maturing spores, basidia, cystidea, and hyphae from the hymenium layer of fresh mushrooms and their maxillae are highly modified for this purpose (Ashe 1984). The galeal setae form a cap over the apex of the lacinial spore brush for efficient collecting of material removed from the hymenium. Other adaptations of the gyrophaenes to their ephemeral and unpredictable habitat and food source are a short life cycle and efficiency in locating and colonizing their mushroom hosts (for details, see Ashe 1984). Adults may also be found in moist forest litter and under logs, which may be an adaptation for survival when few suitable mushroom habitats are available (Ashe 1984). Some adults were collected by one of us (RPW) quite early in the season, which would suggest that some species probably overwinter in litter as adults.

Geographic distribution. Sixty-two valid species of *Gyrophaena* and seven species of *Eumicrota* are known from America north of Mexico (Ashe 2001); 31 species, including present records, are known to occur in Canada.

Phylogenetic affiliation. *Gyrophaena* and allied genera are considered to comprise a subtribe of Gyrophaenina, which is a sister taxon of subtribe Bolitocharina (Ashe 1984). Ashe (1984) recognized three major evolutionary lineages of Gyrophaenina: the "*Brachida*" lineage, the "*Sternotropa*" lineage, and the "*Gyrophaena*" lineage. The "*Gyrophaena*" lineage includes *Gyrophaena*, *Phanerota* and *Eumicrota*. The "*Sternotropa*" lineage includes *Agaricochara*, *Brachychara*, *Agaricomorpha*, *Adelarthra*, *Pseudoligota* and *Sternotropa*. The "*Brachida*" lineage includes *Brachida* and *Probrachida*. The "*Gyrophaena*" lineage is considered to be a sister group of the "*Sternotropa*" lineage. For details, see Ashe (1984).

Checklist of *Gyrophaena* Mannerheim species occurring in Canada with the United States records

Conventions. Junior synonyms are indented. The United States records, particularly from the states bordering Canada, are also included. Countries and provinces in bold font represent new records. Species follow the taxonomic order established by Seevers (1951). * Holarctic species; † adventive species introduced into North America.

Checklist of Gyrophaenina Kraatz occurring in Canada

Genus *Gyrophaena* Mannerheim, 1830: 74

Type species: *Staphylinus nanus* Paykull, 1800.

I. *Gyrophaena* (*Gyrophaena*) *nana* species group

1. *Gyrophaena* (*Gyrophaena*) *nana* (Paykull, 1800: 408)* (CANADA: Alberta, British Columbia, Manitoba, Ontario, and Yukon Territory; UNITED

STATES: Alaska, Maine, Massachusetts, Michigan, Montana, Wisconsin, and Wyoming).

2. *Gyrophaena* (*Gyrophaena*) *neonana* Seevers, 1951: 679 (CANADA: Yukon Territory; UNITED STATES: Indiana, North Carolina, Pennsylvania, and Wisconsin).

II. *Gyrophaena* (*Gyrophaena*) *keeni* species group

3. *Gyrophaena* (*Gyrophaena*) *keeni* Casey, 1911: 185 (CANADA: Alberta, British Columbia, New Brunswick, Ontario, Quebec, and Yukon Territory; UNITED STATES: Florida, Maine, Massachusetts, Montana, New Hampshire, New York, Tennessee, Washington and Wyoming).
4. *Gyrophaena* (*Gyrophaena*) *nanoides* Seevers, 1951: 684 (CANADA: Ontario and Quebec; UNITED STATES: District of Columbia, Indiana, Iowa, Virginia, and Wisconsin).
5. *Gyrophaena* (*Gyrophaena*) *caseyi* Seevers, 1951: 684 (CANADA: **New Brunswick** and Quebec; UNITED STATES: Michigan, New York, North Carolina, and Pennsylvania).

III. *Gyrophaena* (*Gyrophaena*) *laetula* species group

6. *Gyrophaena* (*Gyrophaena*) *laetula* Casey, 1906: 300 (**CANADA: New Brunswick**; UNITED STATES: District of Columbia, Illinois, Indiana, Kentucky, Massachusetts, New York, Pennsylvania, Tennessee, Virginia, and Wisconsin).
   Gyrophaena fustifer Casey, 1906: 300.
   Gyrophaena centralis Casey, 1906: 301.

IV. *Gyrophaena* (*Gyrophaena*) *illiana* species group

7. *Gyrophaena* (*Gyrophaena*) *illiana* Seevers, 1951: 688 (**CANADA: New Brunswick**; UNITED STATES: Illinois, Indiana, and Wisconsin).

V. *Gyrophaena* (*Gyrophaena*) *sculptipennis* species group

8. *Gyrophaena* (*Gyrophaena*) *sculptipennis* Casey, 1906: 298 (CANADA: **New Brunswick**, Nova Scotia, and Quebec; UNITED STATES: New Hampshire, New York, and Wisconsin).

VI. *Gyrophaena* (*Gyrophaena*) *fasciata* species group

9. *Gyrophaena* (*Gyrophaena*) *involuta* Casey, 1906: 294 (**CANADA: New Brunswick**; UNITED STATES: Maine, Massachusetts, New York, and Wisconsin).

VII. *Gyrophaena* (*Gyrophaena*) *egena* species group

10. *Gyrophaena* (*Gyrophaena*) *egena* Casey, 1906: 303 (CANADA: Ontario and Quebec; UNITED STATES: Massachusetts, North Carolina, Pennsylvania, and Rhode Island).
    Gyrophaena (*Gyrophaena*) *exilis* Casey, 1906: 304.

VIII. *Gyrophaena* (*Gyrophaena*) *lobata* species group

11. *Gyrophaena* (*Gyrophaena*) *lobata* Casey, 1906: 294 (**CANADA: New Brunswick**; UNITED STATES: District of Columbia, Illinois, Indiana, Kansas, Michigan, New York, and Wisconsin).

IX. *Gyrophaena* (*Gyrophaena*) *affinis* species group

12. *Gyrophaena* (*Gyrophaena*) *affinis* Sahlberg, 1834: 383† (CANADA: British Columbia, Manitoba, New Brunswick, Nova Scotia, and Quebec; UNITED STATES: District of Columbia, Illinois, Indiana, Iowa, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Tennessee, Washington, West Virginia, and Wisconsin).
    Gyrophaena subpunctata Casey, 1906: 299.
    Gyrophaena lacustris Casey, 1906: 299.
13. *Gyrophaena* (*Gyrophaena*) *dybasi* Seevers, 1951: 697 (**CANADA: New Brunswick**; UNITED STATES: Illinois, Indiana, Missouri, North Carolina, and Wisconsin).

X. *Gyrophaena* (*Gyrophaena*) *pulchella* species group

14. *Gyrophaena* (*Gyrophaena*) *antennalis* Casey, 1906: 295 (CANADA: New Brunswick; UNITED STATES: Massachusetts, New York, and North Carolina).
15. *Gyrophaena* (*Gyrophaena*) *chippewa* Seevers, 1951: 705 (**CANADA: New Brunswick**; UNITED STATES: Michigan, North Carolina, and Wisconsin).
16. *Gyrophaena* (*Gyrophaena*) *insolens* Casey, 1906: 295 (CANADA: British Columbia, New Brunswick, and Ontario; UNITED STATES: Michigan).
17. *Gyrophaena* (*Gyrophaena*) *criddlei* Casey, 1911: 184 (CANADA: Manitoba and **New Brunswick**).
18. *Gyrophaena* (*Gyrophaena*) *pseudocriddlei* Klimaszewski & Webster, **sp. n.** (**CANADA: New Brunswick**).
19. *Gyrophaena* (*Gyrophaena*) *gilvicollis* Casey, 1906, 296 (CANADA: Ontario [uncertain record by Campbell and Davies 1991] and **New Brunswick**; UNITED STATES: District of Columbia, Indiana, Michigan, New York, Pennsylvania, Virginia, and West Virginia).
20. *Gyrophaena* (*Gyrophaena*) *modesta* Casey, 1906: 296 (CANADA: New Brunswick; UNITED STATES: Illinois, Indiana, Michigan, Minnesota, New Hampshire, and New York).

XI. *Gyrophaena* (*Gyrophaena*) *fuscicollis* species group

21. *Gyropheana* (*Gyrophaena*) *fuscicollis* Casey, 1906: 296; Seevers 1951: 712 (**CANADA: New Brunswick**; UNITED STATES: District of Columbia, Illinois, New York, Pennsylvania, and Wisconsin).

XII. *Gyrophaena* (*Gyrophaena*) *vitrina* species group

22. *Gyrophaena* (*Gyrophaena*) *vitrina* Casey, 1906: 291 (CANADA: **New Brunswick**, Ontario, and Quebec; UNITED STATES: Illinois, Indiana, Kentucky, Maine, Michigan, New York, North Carolina, Pennsylvania, Tennessee, West Virginia, and Wisconsin).
Gyrophaena attonsa Casey, 1911: 184.

XIII. *Gyrophaena* (*Gyrophaena*) *bihamata* species group

23. *Gyrophaena* (*Gyrophaena*) *uteana* Casey, 1906: 292 (CANADA: British Columbia**, New Brunswick**, and Quebec; UNITED STATES: California, Colorado, and Utah).
Gyrophaena pacifica Casey, 1906: 293.
24. *Gyrophaena* (*Gyrophaena*) *gaudens* Casey, 1906: 292 (CANADA: **New Brunswick**, Ontario, and Quebec; UNITED STATES: Illinois, Indiana, Massachusetts, Michigan, Pennsylvania, and Wisconsin).
25. *Gyrophaena* (*Gyrophaena*) *flavicornis* Melsheimer, 1844: 31 (CANADA: **New Brunswick**, Nova Scotia, Ontario, and Quebec; UNITED STATES: District of Columbia, Illinois, Indiana, Kentucky, Maine, Massachusetts, Michigan, New Hampshire, North Carolina, Maryland, New Jersey, New York, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Wisconsin, and West Virginia).

XIV. *Gyrophaena (Phaenogyra) strictula* species group

26. *Gyrophaena (Phaenogyra) gracilis* Seevers, 1951: 727 (**CANADA: New Brunswick**; UNITED STATES: Wisconsin).
27. *Gyrophaena (Phaenogyra) subnitens* Casey, 1906: 302 (CANADA: Manitoba**, New Brunswick**, and Ontario; UNITED STATES: Illinois, Kansas, Maine, Michigan, Minnesota, Missouri, New York, and Wisconsin).
28. *Gyrophaena (Phaenogyra) meduxnekeagensis* Klimaszewski & Webster, **sp. n.** (**CANADA: New Brunswick**, **Quebec**).
29. *Gyrophaena (Phaenogyra) californica* (Casey, 1906: 353) (CANADA: British Columbia; UNITED STATES: California and Colorado).

XV. Genus *Eumicrota* Casey, 1906: 28

Type species: *Gyrophaena corruscula* Erichson, 1840.

30. *Eumicrota corruscula* (Erichson, 1840: 189) (CANADA: **New Brunswick** and Quebec; UNITED STATES: Alabama, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Missouri, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin).
31. *Eumicrota socia* (Erichson, 1840: 189) (CANADA: **New Brunswick**, Nova Scotia, and Quebec; UNITED STATES: Arkansas, District of Columbia,

Florida, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Missouri, New York, North Carolina, Ohio, Pennsylvania, Virginia, South Carolina, Tennessee, Texas, West Virginia, and Wisconsin).
Eumicrota humeralis, Casey 1906: 282.
Eumicrota texanella, Casey 1906: 282.
Eumicrota melania, Casey 1906: 283.
Eumicrota pallidula, Casey 1906: 283.
Eumicrota insolita, Notman 1920: 719.

Key to New Brunswick species of Gyrophaenina

(Note: male genitalia offer excellent and ultimate diagnostic characteristics for most species identification)

1. Body usually bicoloured, flavate to brown, often with strongly contrasting areas (Figs 4–24); pronotum at most two-thirds wider than long; antennae moderately broadening apically, 5th article not conspicuously broader than 4th, mesosternal process longer than metasternal process, its apex not margined (subgenus ***Gyrophaena***) **6**
- Body approximately uniformly dark brown (Figs 25–30); pronotum from slightly transverse (Figs 1, 27, 28) to approximately twice as wide as long (Figs 25, 26, 29, 30); antennae incrassate and often forming loose club, 5th article conspicuously broader than 4th; mesosternal process longer than metasternal process or approximately of the same length, its apex margined **2**

2(1). Postocular area of head short, sides strongly converging posteriorly (Figs 29, 30); pronotum approximately twice as wide as long; mesosternal and metasternal processes of approximately the same length (genus ***Eumicrota***) **3**
- Postocular area of head moderately to strongly elongate, sides subparallel or moderately converging posteriorly (Figs 1, 25–28); pronotum less than twice as wide as long (Figs 1, 25–28); mesosternal process longer than metasternal process (Fig. 2) (subgenus ***Phaenogyra***)..... **4**

3(2). Pronotum moderately transverse, broadest in its basal fourth, sides strongly converging apically (Fig. 29); male tergite 8 truncate apically and with small median lobe of variable size (Fig. 194); female tergite 8 truncate apically (Fig. 197); median lobe of aedeagus as illustrated (Fig. 192) .....***E. corruscula* (Erichson)**
- Pronotum strongly transverse, broadest at the middle, sides moderately converging apically (Fig. 30); male and female tergite 8 emarginate apically and with two large lobes (Figs 201, 204); median lobe of aedeagus as illustrated (Fig. 199).....***E. socia* (Erichson)**

4(2). Postocular area of head strongly elongate and subparallel (Figs 1, 3, 28); pronotum narrow and slightly transverse (Fig. 1); abdomen broad, its maximum width greater than that of elytra (Fig. 1); genital structures as illustrated (Figs 184–191)..... ***G. (P.) gracilis* Seevers**

- Postocular area of head moderately elongate and narrowed posteriorly (Figs 25, 26); pronotum broad and strongly transverse (Figs 25, 26); abdomen moderately broad, its maximum width approximately that of elytra (Figs 25, 26) **5**

5(4). Antennae light yellow, rarely darkening apically; elytra transverse, at suture as long as pronotum (Fig. 25); male tergite 8 usually with two teeth between two larger lateral teeth or median teeth lacking (Fig. 168); tubus of median lobe of aedeagus evenly arcuate in lateral view, without basal swelling (Fig. 166)..... ***G. (P.) subnitens* Casey**

- Antennae yellow-brown to brown, distinctly darkening apically and sometimes blackening; elytra elongate, at suture longer than pronotum (Fig. 26); male tergite 8 with 2–3 small teeth between two larger lateral teeth (Fig. 175); tubus of median lobe of aedeagus unevenly arcuate in lateral view and with basal swelling (Fig. 173)..... ***G. (P.) meduxnekeagensis* Klimaszewski & Webster, sp. n.**

6(1). Head and pronotum usually yellow to light yellow-brown (Figs 13, 14)..... 7

- Head dark brown to black, pronotum yellow-brown to dark brown (Figs 1–12, 15–24)..... **8**

7(6). Pronotum approximately quadrate (Fig. 13); genital structures as illustrated (Figs 89–95) ..... ***G. (G.) antennaelis* Casey**

- Pronotum distinctly transverse (Fig. 14); genital structures as illustrated (Figs 96–99)..... ***G. (G.) chippewa* Seevers**

8(6). Pronotum uniformly coloured, yellow to dark brown (Figs 1–9, 11–20, 22–24)..... **9**

- Pronotum bicoloured, median part of the disc dark brown and sides light yellowish- brown (Figs 10, 21)..... **25**

9(8). Pronotum uniformly dark brown to nearly black, usually strongly transverse (Figs 4, 7, 20, 22–24) **10**

- Pronotum uniformly yellow to light brown, slightly to strongly transverse (Figs 5, 6, 8, 9, 11, 12, 15, 16–19) **15**

10(9). Antennae entirely light yellow (Figs 20, 24); elytra yellowish with irregular dark patches (Figs 20, 24), genital structures as illustrated (Figs 132–138, 159–165)..... **11**

- Antennae light to dark brown, always darkening apically (Figs 4, 7, 22, 23); elytra dark brown to black with light brown patches (Figs 4, 7, 22, 23), genital structures as illustrated (Figs 32–38, 53–56, 145–158) **12**

11(10). Body broadly subparallel, abdomen broad and subparallel (Fig. 24), genital structures as illustrated (Figs 159–165) .... ***G. (G.) flavicornis* Melsheimer**

- Body narrowly oval, abdomen narrow and tapering posteriorly (Fig. 20), genital structures as illustrated (Figs 132–138)..... ***G. (G.) fuscicollis* Casey**

12(10). Body distinctly bicoloured, humeri of elytra and often basal part of abdomen paler, moderately glossy (Figs 4, 22, 23)..... **13**

- Body approximately uniformly dark brown, strongly glossy, broad, pronotum strongly transverse (Fig. 7); genital structures as illustrated (Figs 53–56) ..... ***G. (G.) illiana* Seevers**

13(12). Pronotum light reddish-brown, elytra light yellowish-brown with dark brown or black posterior angles, base of abdomen yellowish to light-brown, apical part dark brown (Fig. 4); genital structures as illustrated (Figs 31–38) ..... ***G. (G.) keeni* Casey**

- Pronotum dark brown, elytra dark brown with small, irregularly distributed, paler patches, base of abdomen light yellowish-brown (Figs 22, 23); genital structures as illustrated (Figs 145–158) **14**

14(13). Antennae uniformly light yellow (Fig. 22); genital structures as illustrated (Figs 145–151) ..... ***G. (G.) uteana* Casey**

- Antennae infuscated (Fig. 23), genital structures as illustrated (Figs 152–158) ..... ***G. (G.) gaudens* Casey**

15(8). Pronotum slightly transverse, almost quadrate (Figs 15–19) **16**

- Pronotum strongly transverse (Figs 5, 6, 8, 9–12) **20**

16(15). Antennal articles 6–10 dark brown (Figs 15, 17) **17**

- Antennal articles 6–10 light yellow (Figs 16, 18–20) **18**

17(16). Body length 2.3–2.8 mm, elytra at suture longer than pronotum (Fig. 15); genital structures as illustrated (Figs 100–106) ..... ***G. (G.) insolens* Casey**

- Body length 1.3–1.5 mm; elytra at suture at most as long as pronotum (Fig. 17); genital structures as illustrated (Figs 111–117) ..... ***G. (G.) pseudocriddlei* Klimaszewski & Webster, sp. n.**

18(16). Elytra black, mottled with irregularly shaped light brown spots, particularly in humeral areas (Figs 16, 18); head uniformly dark brown to black, abdomen yellowish with darker, brownish, posterior portion (Figs 16, 18) **19**

- Elytra uniformly yellow light-brown, some inconspicuous light brown spots may be present; head dark brown to black with paler base, abdomen uniformly light yellow brown (Fig. 19); genital structures as illustrated (Figs 125–131) ..... ***G. (G.) modesta* Casey**

19(18). Abdomen reddish-brown (Fig. 18); genital structures as illustrated (Figs 118–124) ..... ***G. (G.) gilvicollis* Casey**

- Abdomen yellow (Fig. 16); genital structures as illustrated (Figs 107–110) ..... ***G. (G.) criddlei* Casey**

20(15). Body length 1.5–1.7 mm; antennae uniformly light yellow (Fig. 12): genital structures as illustrated (Figs 85–88) ..... ***G. (G.) dybasi* Seevers**

- Body length 1.5–2.3 mm, antennae with basal 4 articles light yellow and remaining articles light to dark brown (Figs 5, 6, 9, 11) **21**

21(20). Body narrow, base of abdomen distinctly narrower than elytra (Fig. 11): genital structures as illustrated (Figs 78–84) ..... ***G. (G.) affinis* Sahlberg**

- Body usually broad, base of abdomen about as broad as elytra (Figs 5, 6, 8, 9) **22**

22(21). Body strongly glossy with bright metallic sheen, abdomen uniformly yellow, sometimes with slightly darker posterior portion (Fig. 5); genital structures as illustrated (Figs 39–45) ..... ***G.* (*G.*) *caseyi* Seevers**

\- Body moderately glossy, abdomen uniformly reddish-brown or with pale base and darker posterior portion (Figs 6, 8, 9) **23**

23(22). Body short and stout, antennae short, not reaching posterior part of elytra (Fig. 6), posterior portion of abdomen dark brown; genital structures as illustrated (Figs 46–52)..... ..... ***G.* (*G.*) *laetula* Casey**

\- Body elongate, antennae long, reaching posterior part of elytra (Figs 8, 9), entire abdomen uniformly reddish-brown; genital structures as illustrated (Figs 57–70) **24**

24(23). Elytra aspirate (Fig. 8); abdomen tapering posteriorly; genital structures as illustrated (Figs 57–63)..... ..... ***G.* (*G.*) *sculptipennis* Casey**

\- Elytra not aspirate (Fig. 9); abdomen subparallel; genital structures as illustrated (Figs 64–70) ..... ***G.* (*G.*) *involuta* Casey**

25(8). Body strongly glossy, elytra bicoloured with scutellar area and posterolateral angles black (Fig. 10); genital structures as illustrated (Figs 71–77) .... ***G.* (*G.*) *lobata* Casey**

\- Body moderately glossy, elytra approximately uniformly dark brown (Fig. 21); genital structures as illustrated (Figs 139–144).... ***G.* (*G.*) *vitrina* Casey**

Subgenus *Gyrophaena* Mannerheim, 1830: 74

Type species: *Staphylinus nanus* Paykull, 1800.
[order of taxa following that in the checklist]

Description. Body flavate to brown, usually not uniformly coloured; mesosternal process longer than metasternal process, its apex not margined; pronotum at most two-thirds wider than long; antennal 5th article not conspicuously broader than 4th, articles 4–10 usually incrassate (Seevers 1951).

II. *Gyrophaena* (*Gyrophaena*) *keeni* species group (Seevers, 1951: 680)

3. *Gyrophaena* (*Gyrophaena*) *keeni* Casey

Figs 4, 31–38; Map 1

Gyrophaena keeni Casey, 1911: 185; Seevers 1951: 681; Moore and Legner 1975: 430; Campbell and Davies 1991: 106.

Description. Body length 1.6–1.9 mm, approximately broadly subparallel; head rufo-piceous to piceous; pronotum reddish-brown or medium dark brown; elytra light reddish-brown or light brown with dark brown posterior angles; abdomen reddish-

Figures 4–9. *Gyrophaena* species in dorsal view (apical part of abdomen removed): **4** *G.* (*G.*) *keeni* Casey **5** *G.* (*G.*) *caseyi* Seevers **6** *G.* (*G.*) *laetula* Casey **7** *G.* (*G.*) *illiana* Seevers **8** *G.* (*G.*) *sculptipennis* Casey and **9** *G.* (*G.*) *involuta* Casey.

brown or light brown with piceous posterior portion. Punctation: vertex of head with at least six small punctures on each side; pronotum with median rows of usually three punctures and a small cluster medially near base of disc; elytra sparsely and irregularly punctate. Microsculpture: finely meshed and strong on head and pronotum. Antennae as illustrated (Fig. 4). Pronotum 1.4 times as wide as long. MALE: tergite 8 with two long lateral teeth and two shorter median teeth (Fig. 34); sternite 8 broadly arcuate apically (Fig. 35). Median lobe of aedeagus with narrowly triangular tubus sinuate laterally (Figs 31, 32), dorsal projection of internal sac tubular and short, flagellum everted and coiled (Fig. 32), compressor plate elevated (Fig. 32). Paramere as illustrated (Fig. 33). FEMALE. Tergite 8 truncate apically (Fig. 37); sternite 8 apically pointed (Fig. 38); spermatheca as illustrated (Fig. 36).

Bionomics. Macrohabitat: Mature mixed forest, 8.5-year-old regenerating mixed forest, eastern white cedar (*Thuja occidentalis* L.) swamps and red spruce (*Picea rubens* Sarg.) and red maple (*Acer rubrum* L.) forest (80–120 years old). This species has been found in a conifer forest and an eastern hemlock forest [*Tsuga canadensis* (L.)] (120+ years old). **Microhabitat:** Gilled fungi on rotten log, in gilled mushrooms, in gilled mushrooms on stump, in moss near brook, on polypore fungi on dead standing *Populus* sp. **Collecting period:** June, July, August, and September. **Collecting method:** sifting mushrooms, aspirating and hand picking specimens.

Distribution (Map 1). CANADA: Alberta, British Columbia, New Brunswick, Ontario, Quebec, Yukon Territory; UNITED STATES: Florida, Maine, Massachusetts, Montana, New Hampshire, New York, Tennessee, Washington and Wyoming.

Map 1. Collection localities in New Brunswick, Canada of *Gyrophaena keeni*

5. *Gyrophaena* (*Gyrophaena*) *caseyi* Seevers

Figs 5, 39–45; Map 2

Gyrophaena caseyi Seevers, 1951: 684; Moore and Legner 1975: 428; Campbell and Davies 1991: 106.

Description. Body length 1.6–2.0 mm, approximately broadly subparallel; head rufous, rufo-piceous to (rarely) black; pronotum rufo-flavate, sometimes darker basally; elytra flavate or flavo-testaceous, mottled with darker brown posterocentral section of disc; abdomen flavo-testaceous with slightly darker apex. Punctation: vertex of head with at least six umbilicate punctures on each side; pronotum moderately densely punctured; elytra finely, irregularly punctate. Microsculpture: finely meshed and strong on head and elytra, obsolete on pronotum. Antennae as illustrated (Fig. 5). Pronotum 1.4 times as wide as long. MALE: tergite 8 with two large rounded lateral teeth and two smaller median teeth (Fig. 41); sternite 8 broadly rounded apically (Fig. 42). Median lobe of aedeagus with approximately triangular tubus bearing median swelling and small and narrow apical projection directed dorsally in lateral view (Fig. 39), dorsal projection of internal sac narrowly elongate and twisted (Fig. 39). Paramere as illustrated (Fig. 40). FEMALE. Tergite 8 truncate apically (Fig. 44); sternite 8 slightly pointed medially (Fig. 45); spermatheca as illustrated (Fig. 43).

Bionomics. Macrohabitat: mixed forest, mixed forest with hemlock, hardwood forest, yellow birch (*Betula alleghaniensis* Britt.) and spruce forest, red spruce forest,

Map 2. Collection localities in New Brunswick, Canada of *Gyrophaena caseyi*

mature red maple and red spruce forest. **Microhabitat:** on gilled mushrooms, on small gilled mushrooms on side of rotten logs, on *Pleurotus* sp. growing on side of logs. **Collecting period:** August and September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 2). CANADA: **New Brunswick**, Quebec; UNITED STATES: Michigan, New York, North Carolina, and Pennsylvania.

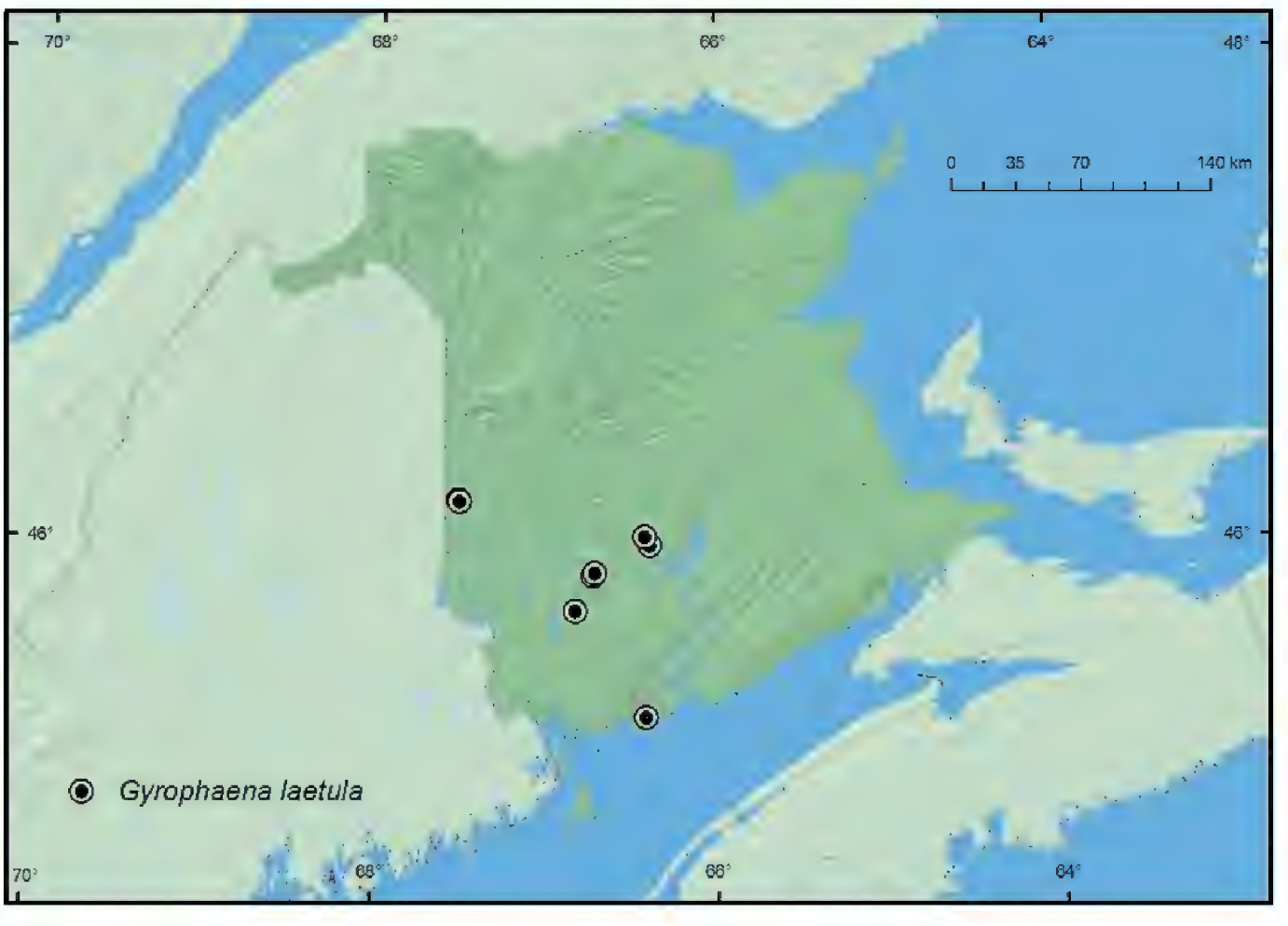
III. *Gyrophaena (Gyrophaena) laetula* species group (Seevers, 1951: 685)

6. *Gyrophaena* (*Gyrophaena*) *laetula* Casey

Figs 6, 46–52; Map 3

Gyrophaena laetula Casey, 1906: 300; Seevers 1951: 685; Moore and Legner 1975: 430.
Gyrophaena fustifer Casey, 1906: 300. Synonymized by Seevers 1951: 685.
Gyrophaena centralis Casey, 1906: 301. Synonymized by Seevers 1951: 685.

Description. Body length 1.5–1.7 mm, stout and compact; head rufo-piceous; pronotum rufo-testaceous; elytra light brown; abdomen rufo-testaceous to reddish-brown with dark brown apical portion. Punctation: vertex of head with at least 10 large umbilicate punctures on each side, pronotum irregularly punctate, median rows with punctures confused by scattered punctures; elytra finely and sparsely



Map 3. Collection localities in New Brunswick, Canada of *Gyrophaena laetula*

punctate. Microsculpture: finely meshed and throughout. Antennae as illustrated (Fig. 6). Pronotum 1.7 times as wide as long. MALE: tergite 8 with two large rounded teeth and 2–4 smaller median teeth (Fig. 48); sternite 8 broadly rounded apically (Fig. 49). Median lobe of aedeagus with moderately broadly elongate tubus with apical part produced ventrally and bearing small, narrow apical projection directed anteriad in lateral view (Fig. 46), dorsal projection of internal sac irregularly elongate in shape (Fig. 46). Paramere as illustrated (Fig. 47). FEMALE. Tergite 8 truncate apically (Fig. 51); sternite 8 pointed apically (Fig. 52); spermatheca as illustrated (Fig. 50).

Bionomics. Macrohabitat: Mixed forests, mature mixed forests, regenerating mixed forest, red spruce and yellow birch forest, mature red spruce and red maple forest, forested black spruce (*Picea mariana* (Mill.) BSP) bog with red maple. **Microhabitat:** on/in gilled mushrooms, on *Pleurotus* sp. on dead standing *Populus tremuloides* Michx. **Collecting period:** June, July, August, and September. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 3). **CANADA: New Brunswick**; UNITED STATES: District of Columbia, Illinois, Indiana, Kentucky, Massachusetts, New York, Pennsylvania, Tennessee, Virginia, and Wisconsin.

IV. *Gyrophaena* (*Gyrophaena*) *illiana* species group (Seevers, 1951: 688)

7. *Gyrophaena* (*Gyrophaena*) *illiana* Seevers

Figs 7, 53–56; Map 4

Gyrophaena illiana Seevers, 1951: 688; Moore and Legner 1975: 430.

Description. Body length 1.7–1.8 mm, stout and compact; head piceous; pronotum rufo-piceous to piceous; elytra uniformly brown or light brown with piceous posterior angles; abdomen rufo-testaceous to dark brown. Punctation: vertex of head with some eight small punctures on each side, pronotum with one conspicuous puncture in median row on each side and with a few scattered punctures elsewhere, elytra finely and sparsely punctate. Microsculpture: finely meshed throughout. Antennae as illustrated (Fig. 7). Pronotum 1.6 times as wide as long. MALE: tergite 8 with two large and rounded teeth and some small median tuberosities (Fig. 55); sternite 8 pointed apically (Fig. 56). Median lobe of aedeagus with narrowly elongate and tapering tubus and ventrally projecting apex, apical projection small and narrow, directed anteriad in lateral view (Fig. 53), dorsal projection of internal sac narrow and sinuate (Fig. 53). Paramere as illustrated (Fig. 54). FEMALE. Unknown.

Bionomics. Macrohabitat: red maple and red oak (*Quercus rubra* L.) forest. **Microhabitat:** on a polypore fungus growing on a log. **Collecting period:** August. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 4). **CANADA: New Brunswick**; UNITED STATES: Illinois, Indiana, and Wisconsin.

Map 4. Collection localities in New Brunswick, Canada of *Gyrophaena illiana*

V. *Gyrophaena* (*Gyrophaena*) *sculptipennis* species group (Seevers, 1951: 689)

8. *Gyrophaena* (*Gyrophaena*) *sculptipennis* Casey

Figs 8, 57–63; Map 5

Gyrophaena sculptipennis Casey, 1906: 298; Seevers 1951: 689; Moore and Legner 1975: 431; Campbell and Davies 1991: 106.

Description. Body length 1.9–2.2 mm, narrowly oval; head rufo-piceous to piceous; pronotum flavate; elytra flavate to dark brown; abdomen reddish-brown. Punctation: vertex of head with at least eight large umbilicate punctures on each side, pronotum with conspicuous puncture in median row on each side and with a few scattered punctures elsewhere, elytra moderately densely punctate. Microsculpture: weakly reticulate on head only. Antennae as illustrated (Fig. 8). Pronotum 1.4 times as wide as long. MALE: tergite 8 with two large rounded teeth and 2–5 smaller rounded median teeth (Fig. 59); sternite 8 broadly rounded apically (Fig. 60). Median lobe of aedeagus with moderately narrow tubus and acute apex projecting ventrally, apical projection small and narrow, directed anteriad in lateral view (Fig. 57), dorsal projection of internal sac narrowly elongate and sinuate (Fig. 57). Paramere as illustrated (Fig. 58). FEMALE. Tergite 8 shallowly emarginate posteriorly and with two lateral teeth (Fig. 62); sternite 8 broadly rounded posteriorly (Fig. 63); spermatheca as illustrated (Fig. 61).

Bionomics. Macrohabitat: mixed forest, mature mixed forest, regenerating mixed forest, hardwood forest, maple forest, red oak and red maple forest, mature red spruce

Map 5. Collection localities in New Brunswick, Canada of *Gyrophaena sculptipennis*

and red maple forest, hemlock forest (120+ years old), forested black spruce bog with red maple. **Microhabitat:** on/in gilled mushrooms on forest floor, on stalked polypore mushrooms on forest floor, and on *Pleurotus* sp. on log. **Collecting period:** June, July, August and September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 5). CANADA: **New Brunswick** and Nova Scotia, Quebec; UNITED STATES: New Hampshire, New York, and Wisconsin.

Comments. Our specimens agree in all respects with the description and illustrations of this species by Seevers (1951), but tergite 8 of males in our specimens has only 2–4 median small teeth while in Seever's illustration there are 5 small median teeth. We attribute this difference to intra-specific variation.

VI. *Gyrophaena* (*Gyrophaena*) *fasciata* species group (Seevers, 1951: 690)

9. *Gyrophaena* (*Gyrophaena*) *involuta* Casey

Figs 9, 64–70; Map 6

Gyrophaena (*Gyrophaena*) *involuta* Casey, 1906: 294; Seevers 1951: 691; Moore and Legner 1975: 431; Campbell and Davies 1991: 106.

Description. Body length 1.8–2.0 mm, subparallel; head brown to piceous; pronotum flavate; elytra brown to dark brown; abdomen rufo-flavate, apical part of abdomen some-

Map 6. Collection localities in New Brunswick, Canada of *Gyrophaena involuta*

times darker. Punctation: vertex of head with at least seven small umbilicate punctures on each side, pronotum with two weakly defined median rows of punctures, elytra finely and sparsely punctate. Microsculpture: reticulate throughout, often weakly so on elytra. Antennae as illustrated (Fig. 9). Pronotum 1.3 times as wide as long. MALE: tergite 8 with two narrowly elongate and rounded lateral teeth and two slightly smaller rounded median teeth (Fig. 66); sternite 8 broadly rounded apically (Fig. 67). Median lobe of aedeagus with broad and ventrally angular tubus, apex narrow and acute (Fig. 64), dorsal projection of internal sac short and irregular in shape (Fig. 64). Paramere as illustrated (Fig. 65). FEMALE. Tergite 8 truncate posteriorly (Fig. 69); sternite 8 broadly rounded and slightly emarginate medially (Fig. 70); spermatheca as illustrated (Fig. 68).

Bionomics. Macrohabitat: hardwood forest, hardwood forest with hemlock, mature red spruce and red maple forest, and mature mixed forest. **Microhabitat:** in gilled mushrooms on forest floor, small gilled mushrooms on log, on *Pleurotus* sp. on log. **Collecting period:** August. **Collecting method:** sifting mushrooms and aspirating adults.

Distribution (Map 6). **CANADA: New Brunswick**; UNITED STATES: Maine, Massachusetts, New York, and Wisconsin.

VIII. *Gyrophaena* (*Gyrophaena*) *lobata* species group (Seevers 1951: 693)

11. *Gyrophaena* (*Gyrophaena*) *lobata* Casey

Figs 10, 71–77; Map 7

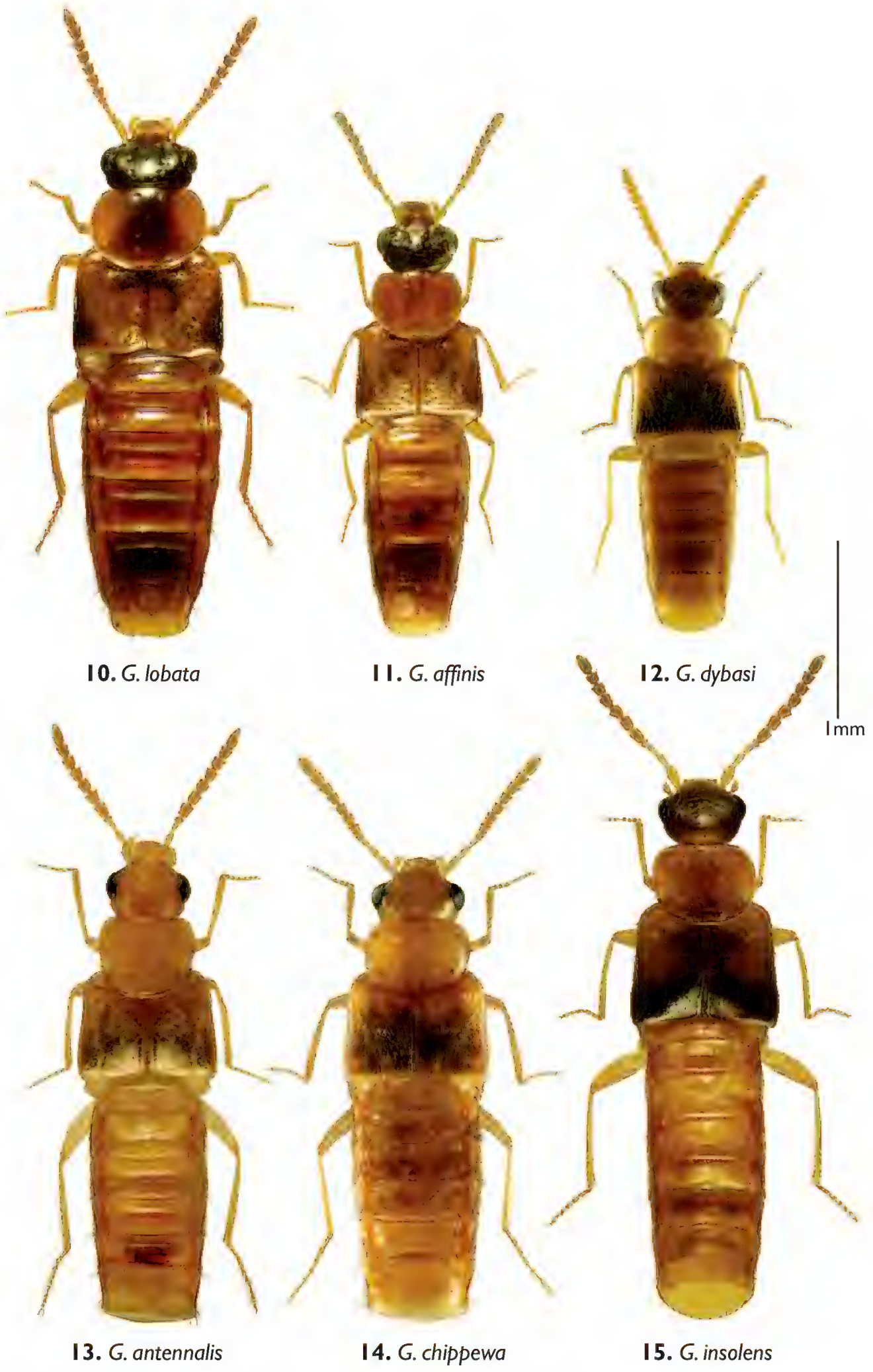
Gyrophaena lobata Casey, 1906: 294; Seevers 1951: 693; Moore and Legner 1975: 430.

Description. Body length 1.9–2.2 mm, narrowly oval and strongly glossy; head rufo-piceous to piceous; pronotum flavate with central part of disc piceous; elytra rufous with scutellar area and posterior angles piceous; abdomen rufo-flavate, apical part of abdomen sometimes darker. Punctation: vertex of head with several large umbilicate punctures on each side, pronotum with a few punctures, elytra finely punctate, in outer part of disc more densely so. Microsculpture: reticulate, distinct on head and weak to obsolete on pronotum and elytra. Antennae as illustrated (Fig. 10). Pronotum 1.3 times as wide as long. MALE: tergite 8 with two small lateral teeth and large median lobe (Fig. 73); sternite 8 broadly rounded apically (Fig. 74). Median lobe of aedeagus with approximately triangular tubus projecting ventrally, its venter strongly sinuate, apex narrow and acute (Fig. 71), dorsal projection of internal sac narrowly elongate and arcuate (Fig. 71). Paramere as illustrated (Fig. 72). FEMALE. Tergite 8 similar to that of male and with apical lobe (Fig. 76); sternite 8 broadly rounded and slightly pointed medially (Fig. 77); spermatheca as illustrated (Fig. 75).

Bionomics. Macrohabitat: mixed and hardwood forests. **Microhabitat:** gilled mushrooms. **Collecting period:** July through September. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 7). **CANADA: New Brunswick**; UNITED STATES: District of Columbia, Illinois, Indiana, Kansas, Michigan, New York, and Wisconsin.

Map 7. Collection localities in New Brunswick, Canada of *Gyrophaena lobata*



Figures 10–15. *Gyrophaena* species in dorsal view (apical part of abdomen removed): **10** *G.* (*G.*) *lobata* Casey **11** *G.* (*G.*) *affinis* Sahlberg **12** *G.* (*G.*) *dybasi* Seevers **13** *G.* (*G.*) *antennalis* Casey **14** *G.* (*G.*) *chippewa* Seevers and **15** *G.* (*G.*) *insolens* Casey.

IX. *Gyrophaena* (*Gyrophaena*) *affinis* species group (Seevers, 1951: 694)

12. *Gyrophaena* (*Gyrophaena*) *affinis* Sahlberg*

Figs 11, 78–84; Map 8

Gyrophaena affinis Sahlberg 1834: 383; Seevers, 1951: 695; Moore and Legner 1975: 427; Campbell and Davies 1991: 106.
Gyrophaena subpunctata Casey, 1906: 299. Synonymized by Seevers 1951: 695.
Gyrophaena lacustris Casey, 1906: 299. Synonymized by Seevers 1951: 695.

Description. Body length 1.7–2.1 mm, narrowly oval; head rufo-piceous to piceous; pronotum flavate to light brown; elytra testaceous to light brown; abdomen rufo-flavate, apical part of abdomen usually darker. Punctation: vertex of head with about 10 large umbilicate punctures on each side, pronotum with a few large punctures, elytra with numerous shallow punctures. Microsculpture: reticulate throughout. Antennae as illustrated (Fig. 11). Pronotum 1.4 times as wide as long. MALE: tergite 8 with two long lateral teeth, margin smooth between them (Fig. 80); sternite 8 broadly rounded apically (Fig. 81). Median lobe of aedeagus with narrowly triangular and subapically split tubus, its venter sinuate and angulate basally, apex narrow and rounded (Fig. 78), dorsal projection of internal sac moderately elongate and coiled with flagellum inside (Fig. 78). Paramere as illustrated (Fig. 79). FEMALE. Tergite 8 truncate apically (Fig. 83); sternite 8 broadly rounded apically and pointed medially (Fig. 84); spermatheca as illustrated (Fig. 82).

Map 8. Collection localities in New Brunswick, Canada of *Gyrophaena affinis*

Bionomics. Macrohabitat: mixed forest, 8.5-year-old regenerating mixed forest, eastern white cedar swamp, mature red spruce, and red maple forest. **Microhabitat:** on/in gilled mushrooms on forest floor, on log, and on a stump, on small gilled mushrooms on side of decayed log. This species has also been found in rotting mushrooms, on orange bracket (polypore) fungus, on bracket fungus on white birch, and on *Pleurotus* sp. on dead standing *Populus tremuloides*. **Collecting period:** June, July, August, and September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 8). This is an adventive Palaearctic species in North America. CANADA: British Columbia, Manitoba, New Brunswick, Nova Scotia, and Quebec; UNITED STATES: District of Columbia, Illinois, Indiana, Iowa, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Missouri, New Hampshire, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Tennessee, Washington, West Virginia, and Wisconsin.

13. *Gyrophaena* (*Gyrophaena*) *dybasi* Seevers

Figs 12, 85–88; Map 9

Gyrophaena (*Gyrophaena*) *dybasi* Seevers, 1951: 697; Moore and Legner 1975: 429.

Description. Body length 1.7–1.9 mm, narrowly oval; head rufo-piceous to piceous; pronotum testaceous; elytra dark testaceous to light brown with paler humeri; ab-

Map 9. Collection localities in New Brunswick, Canada of *Gyrophaena dybasi*

domen rufo-testaceous, apical portion of abdomen sometimes darker. Punctation: vertex of head with about 10 large umbilicate punctures on each side, pronotum with two complete median rows of large punctures, elytra with numerous dense punctures. Microsculpture: reticulate throughout. Antennae as illustrated (Fig. 12). Pronotum 1.7 times as wide as long. MALE: tergite 8 with two long lateral teeth and two small median teeth (Fig. 87); sternite 8 broadly rounded apically (Fig. 88). Median lobe of aedeagus with narrowly elongate sinuate tubus projecting ventrally, apex narrow and pointed (Fig. 85), dorsal projection of internal sac narrowly elongate and coiled, flagellum partially everted and approximately straight (Fig. 85). Paramere as illustrated (Fig. 86). FEMALE. Unknown.

Bionomics. Macrohabitat: mixed forest. **Microhabitat:** on gilled mushrooms. **Collecting period:** June. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 9). **CANADA: New Brunswick**; UNITED STATES: Illinois, Indiana, Missouri, North Carolina, and Wisconsin.

X. *Gyrophaena* (*Gyrophaena*) *pulchella* species group (Seevers, 1951: 703)

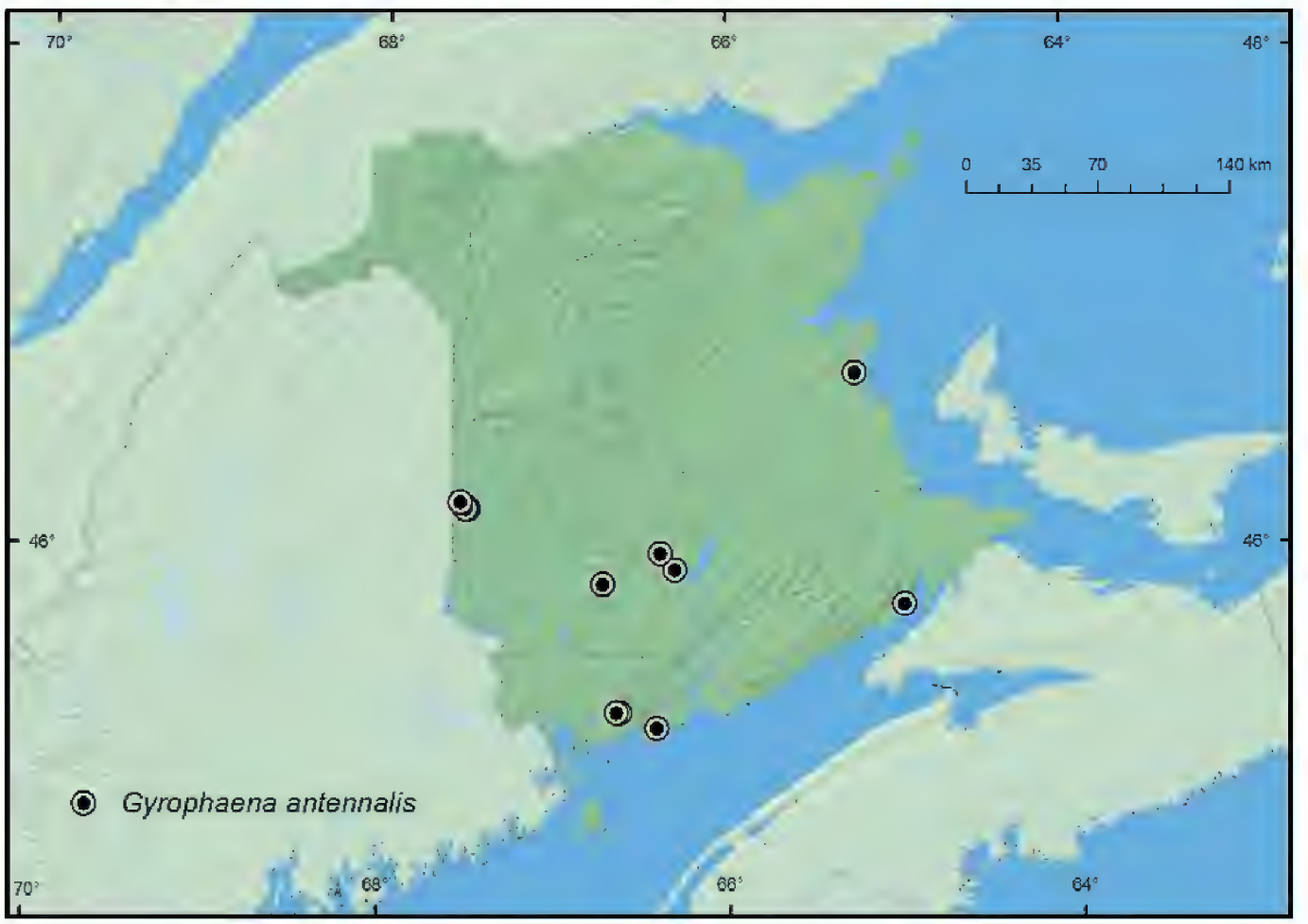
14. *Gyrophaena* (*Gyrophaena*) *antennalis* Casey

Figs 13, 89–95; Map 10

Gyrophaena (*Gyrophaena*) *antennalis* Casey, 1906: 295; Seevers 1951: 704; Moore and Legner 1975: 427; Campbell and Davies 1991: 106.

Description. Body length 2.0–2.5 mm, narrowly oval; head and pronotum usually rufo-testaceous; elytra testaceous to light brown, mottled with small irregular darker spots or (rarely) black posteriorly; abdomen rufo-testaceous, apical part of abdomen sometimes darker. Punctation: vertex of head with about 10 large umbilicate punctures on each side, pronotum with two irregular median rows of large punctures, scattered punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout. Antennae as illustrated (Fig. 13). Pronotum 1.2 times as wide as long. MALE: tergite 8 with two lobe-shaped lateral teeth and usually with two to three small median teeth (Fig. 91); sternite 8 broadly rounded apically and with shallow median emargination (Fig. 92). Median lobe of aedeagus with tube-shaped tubus bearing two long ventral projections, apex rounded (Fig. 89), flagellum slightly projecting from the tip of median lobe (Fig. 89). Paramere as illustrated (Fig. 90). FEMALE. Tergite 8 truncate apically (Fig. 94); sternite 8 rounded apically (Fig. 95); spermatheca as illustrated (Fig. 93).

Bionomics. Macrohabitat: hardwood forest, on ridge with red oak surrounded by silver maple (*Acer saccharinum* L.) forest, mature mixed forest, mixed forest with hemlock, mature red spruce and red maple forest, eastern white cedar swamps, yellow birch, and spruce forest. This species has also been found in conifer forest and a white spruce (*Picea glauca* (Moench) Voss) forest. **Microhabitat:** on/in gilled mushrooms, on *Russula virescens* (Schaeff.) Fr., in *Climacodon septentrionale* (Fr.) Kar. on dead standing sugar maple (*Acer saccharum* Marsh.), on *Pleurotus* sp. on log. Also found on *Heterobasidium*



Map 10. Collection localities in New Brunswick, Canada of *Gyrophaena antennalis*

annosum (Fr.) Bref. (conifer-based polypore). **Collecting period:** August and September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 10). CANADA: New Brunswick; UNITED STATES: Massachusetts, New York, and North Carolina.

15. *Gyrophaena* (*Gyrophaena*) *chippewa* Seevers

Figs 14, 96–99; Map 11

Gyrophaena chippewa Seevers, 1951: 705; Moore and Legner 1975: 428.

Description. Body length 2.0–2.7 mm, narrowly oval; head and pronotum usually rufo-testaceous; elytra testaceous to light brown, mottled with small irregular darker spots; abdomen rufo-testaceous, apical portion of abdomen sometimes darker. Punctation: vertex of head with about eight large umbilicate punctures on each side, pronotum with two irregular median rows of large punctures and scattered punctures elsewhere, elytra with fine and dense punctures. Microsculpture: reticulate throughout. Antennae as illustrated (Fig. 14). Pronotum 1.3 times as wide as long. MALE: tergite 8 with two lobe-shaped lateral teeth and one or two small median teeth (Fig. 98); sternite 8 broadly rounded apically (Fig. 99). Median lobe of aedeagus with long tubular and tapering tubus bearing one long ventral projection near crista apicalis (Fig. 96), flagellum slightly projecting from the tip of elongate dorsal projection of internal sac (Fig. 96). Paramere as illustrated (Fig. 97). FEMALE. Unknown.

Map 11. Collection localities in New Brunswick, Canada of *Gyrophaena chippewa*

Bionomics. Macrohabitat: mixed forest. **Microhabitat:** on gilled mushrooms. **Collecting period:** August. **Collecting method:** sifting mushrooms and aspirating specimens.

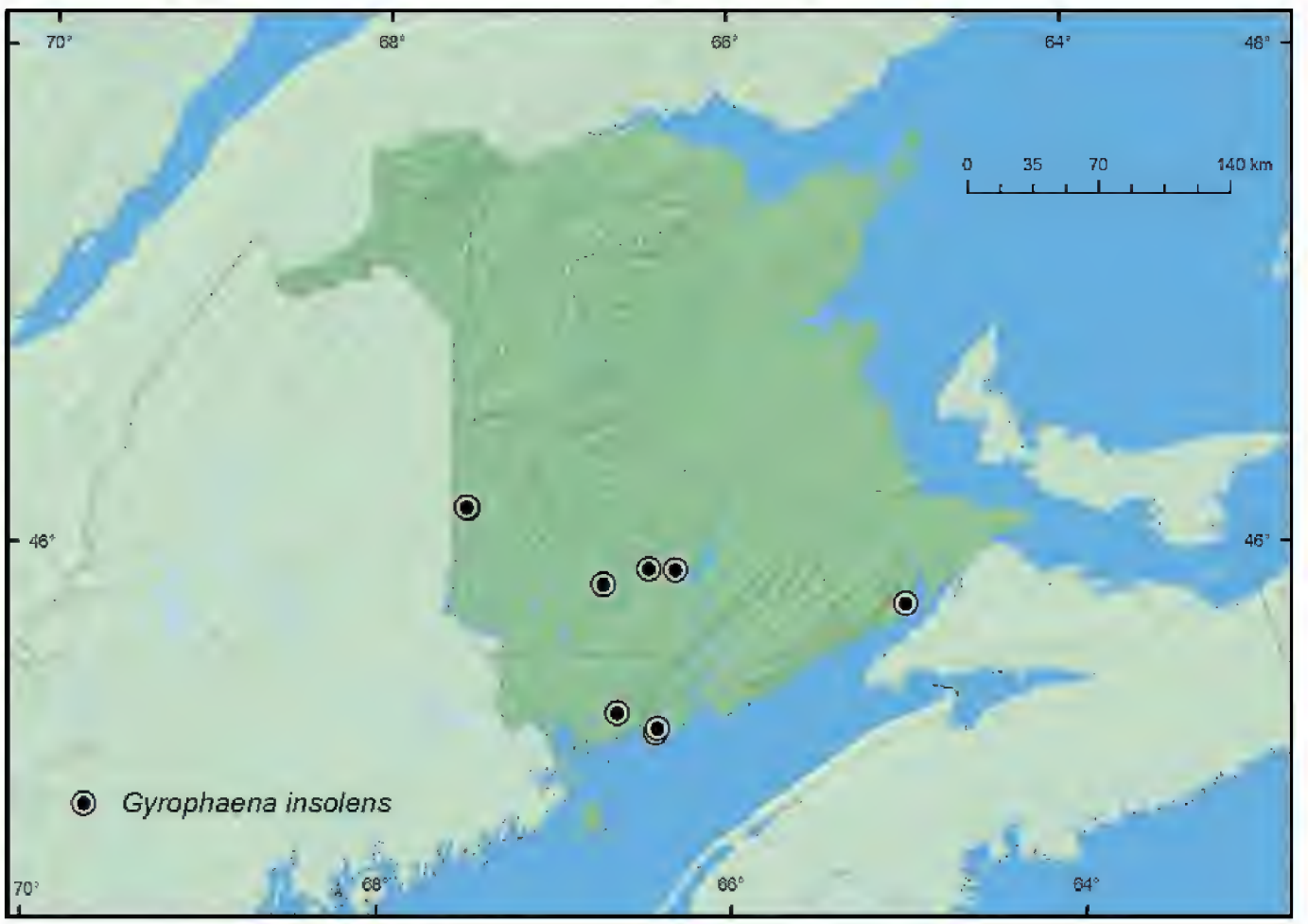
Distribution (Map 11). **CANADA: New Brunswick**; UNITED STATES: Michigan, North Carolina, and Wisconsin.

16. *Gyrophaena* (*Gyrophaena*) *insolens* Casey

Figs 15, 100–106; Map 12

Gyrophaena (*Gyrophaena*) *insolens* Casey, 1906: 295; Moore and Legner 1975: 430.

Description. Body length 1.9–2.5 mm, narrowly oval; head rufo-piceous to piceous; pronotum rufo-testaceous; elytra piceous posteriorly with testaceous humeri, or uniformly testaceous; abdomen rufo-testaceous, apical part of abdomen sometimes darker. Punctation: vertex of head with about 10 large umbilicate punctures on each side, pronotum with two irregular median rows of large punctures, scattered punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout except for pronotum. Antennae as illustrated (Fig. 15). Pronotum 1.2 times as wide as long. MALE: tergite 8 with two lobe-shaped lateral teeth projecting inward and two, but occasionally only one, small median tooth (Fig. 102); sternite 8 broadly rounded apically (Fig. 103). Median lobe of aedeagus with elongate, tube-shaped tubus, bearing three ventral projections, a long basal one and two shorter median ones, one of which is thin and often overlapping or crossing over the wider one and giving the impression of only one median



Map 12. Collection localities in New Brunswick, Canada of *Gyrophaena insolens*

projection (Fig. 100); apical part of internal sac tubular and as long as tubus or extending beyond tubus and with extended flagellum projecting externally from the apex (Fig. 100) [specimens with internal sac longer than the tip of tubus are rare and are listed in locality data base with ?]. Paramere as illustrated (Fig. 101). FEMALE. Tergite 8 truncate apically (Fig. 105); sternite 8 rounded apically (Fig. 106); spermatheca as illustrated (Fig. 104).

Bionomics. Macrohabitat: mixed forest, white and red spruce forest, eastern white cedar swamps, yellow birch and spruce forest, on ridge with oak in silver maple forest, and red oak and red maple forest. **Microhabitat:** on/in gilled mushrooms on forest floor, on *Russula virescens*. **Collecting period:** August and September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 12). CANADA: British Columbia, New Brunswick, Ontario; UNITED STATES: Michigan.

17. *Gyrophaena* (*Gyrophaena*) *criddlei* Casey

Figs 16, 107–110; Map 13

Gyrophaena (*Gyrophaena*) *criddlei* Casey, 1911: 184; Moore and Legner 1975: 429; Campbell and Davies 1991: 106.

Description. Body length 1.7–2.3 mm, narrowly oval; head piceous; pronotum flavotestaceous; elytra flavate to piceous with testaceous humeri; abdomen flavate, apical part of abdomen sometimes darker. Punctation: vertex of head with about 10 large umbilicate

Map 13. Collection localities in New Brunswick, Canada of *Gyrophaena criddlei*

punctures on each side, pronotum with two irregular median rows of large punctures and scattered punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout except for pronotum. Antennae as illustrated (Fig. 16). Pronotum 1.4 times as wide as long. MALE: tergite 8 with two lobe-shaped lateral teeth and usually two (but occasionally one or three) small median teeth, apical margin of disc emarginate (Fig. 109); sternite 8 broadly rounded apically with minute apical emargination (Fig. 110). Median lobe of aedeagus with elongate and slightly arcuate tubus bearing two characteristic (long and short) ventral projections (Fig. 107), flagellum sinuate and projecting externally (Fig. 107). Paramere as illustrated (Fig. 101). FEMALE. Unknown.

Bionomics. Macrohabitat: hardwood and mixed forests. **Microhabitat:** on *Pleurotus* sp. growing on a log, and on fleshy gilled mushrooms. **Collecting period:** September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 13). CANADA: Manitoba and **New Brunswick**.

18. *Gyrophaena* (*Gyrophaena*) *pseudocriddlei* Klimaszewski & Webster, sp. n.

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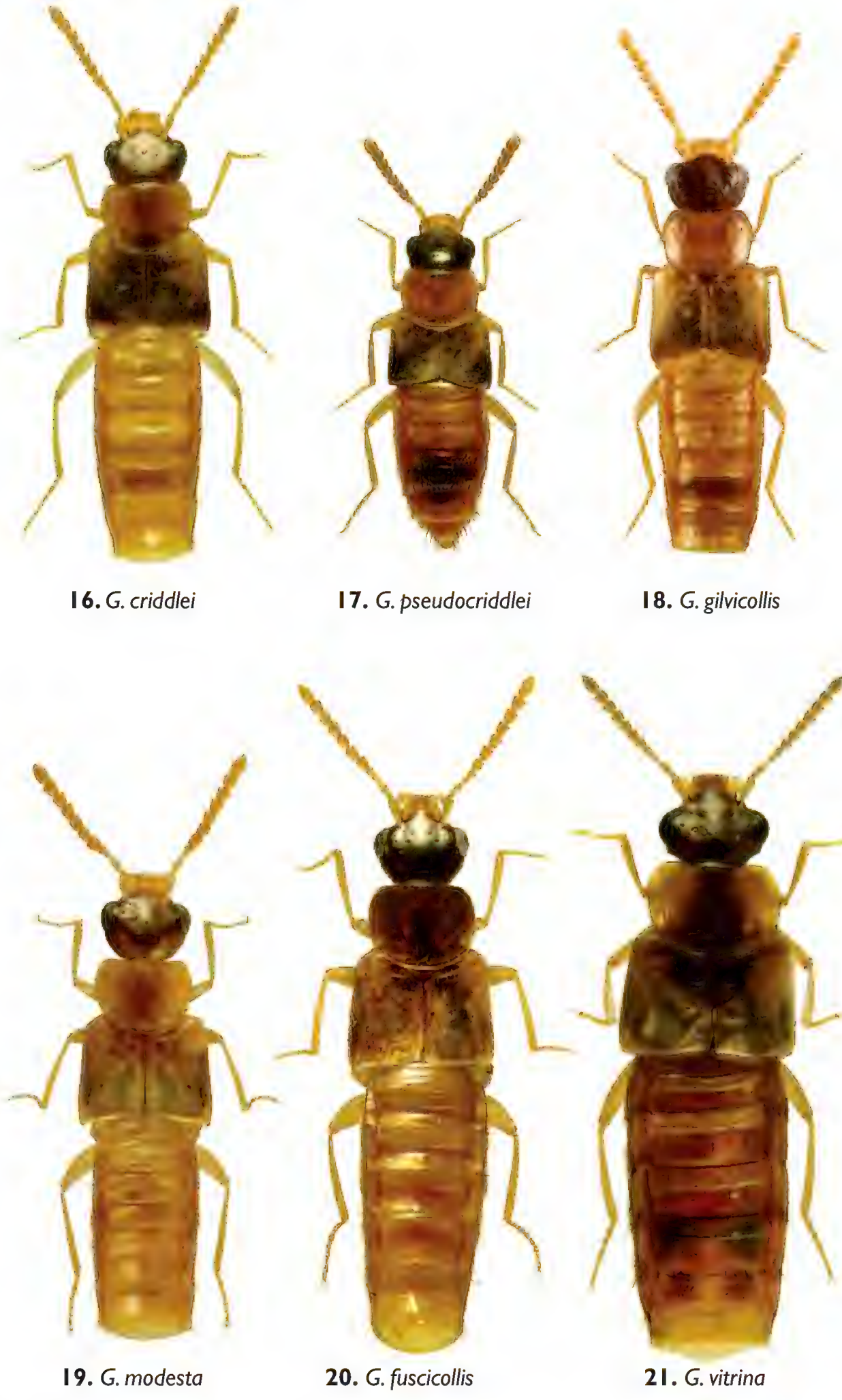
Figs 17, 111–117; Map 14

HOLOTYPE (male): CANADA, New Brunswick, Sunbury Co., Maugerville, Portobello Creek N.W.A., 45.9031°N, 66.4268°W, 11 September 2006, R.P. Webster coll., oak and red maple forest, on stalked polypore mushroom on forest floor (LFC). **PARATYPES:** CAN-



Figures 16–21. *Gyrophaena* species in dorsal view (apical part of abdomen removed): **16** *G.* (*G.*) *criddlei* Casey **17** *G.* (*G.*) *pseudocriddlei* Klimaszewski and Webster, sp. n. **18** *G.* (*G.*) *gilvicollis* Casey **19** *G.* (*G.*) *modesta* Casey **20** *G.* (*G.*). *fuscicollis* Casey and **21** *G.* (*G.*) *vitrina* Casey.

ADA, New Brunswick, Sunbury Co., Maugerville, Portobello Creek N.W.A., 45.9031°N, 66.4268°W, 11 September 2006, R.P. Webster coll., oak and red maple forest, on stalked polypore mushroom on forest floor (1 female, LFC; 6 males, 1 female, RWC); Sunbury Co., Acadia Research Forest (45.9799°N, 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18 September 2007, R.P. Webster (1 male, AFC).

Etymology. Named by adding prefix "*pseudo*" to the specific name "*criddlei*". *Gyrophaena criddlei* Casey is externally similar to this new species.

Description. This species is externally and genitally similar to *G. criddlei* but may be easily distinguished by its smaller body size, short elytra, and the characteristic shape of male tergite 8 and median lobe of aedeagus with differently shaped projections on the tubus.

Body length 1.4–1.5 mm, narrowly oval; head piceous; pronotum rufo-testaceous; elytra piceous with testaceous humeri and irregular small spots; abdomen rufo-testaceous, apical portion of abdomen darker. Punctation: vertex of head with several large umbilicate punctures on each side, pronotum with about four median rows of large punctures and scattered punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout except for pronotum, strongest on head. Antennae as illustrated (Fig. 17). Pronotum 1.3 times as wide as long. MALE: tergite 8 with two small lateral teeth, which may be reduced to small tuberosities, and two small median teeth; apical margin of disc emarginate (Fig. 113); sternite 8 broadly rounded apically (Fig. 114). Median lobe of aedeagus with elongate and straight tubus bearing two characteristic (long and short) ventral projections (Fig. 100), flagellum slightly projecting externally, sinuate in shape (Fig. 111). Paramere as illustrated (Fig. 112). FEMALE.

Map 14. Collection localities in New Brunswick, Canada of *Gyrophaena pseudocriddlei*

Tergite 8 truncate apically (Fig. 116); sternite 8 rounded apically (Fig. 117); spermatheca as illustrated (Fig. 115).

Bionomics. Macrohabitat: red oak and red maple forest, mature red spruce and red maple forest. **Microhabitat:** on stalked polypore mushroom on forest floor, one specimen in gilled mushroom on forest floor. **Collecting period:** September. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 14). **CANADA**: **New Brunswick**.

19. *Gyrophaena* (*Gyrophaena*) *gilvicollis* Casey

Figs 18, 118–124; Map 15

Gyrophaena (*Gyrophaena*) *gilvicollis* Casey, 1906, 296; Seevers 1951: 709; Moore and Legner 1975: 429; Campbell and Davies 1991: 106 [cited doubtfully from Ontario with no locality records from Canada].

Description. Body length 1.8–2.2 mm, narrowly elongate; head piceous to black; pronotum flavate; elytra piceous to black with testaceous humeri and irregular small spots dispersed posteriorly; abdomen flavate, apical part of abdomen darker. Punctation: vertex of head with about 10 large umbilicate punctures on each side, pronotum with a few dispersed large punctures, elytra with fine and sparse punctures. Microsculpture: reticulate throughout except for pronotum, strongest on head. Antennae as illustrated (Fig.

Map 15. Collection localities in New Brunswick, Canada of *Gyrophaena givicollis*

18). Pronotum 1.2 times as wide as long. MALE: tergite 8 with two short medio-lateral lobes and two small median teeth, occasionally reduced to small tuberosities or absent, apical margin of disc emarginated medially (Fig. 120); sternite 8 emarginate apically (Fig. 121). Median lobe of aedeagus with elongate tubus bearing two short baso-ventral projections near crista apicalis (Fig. 118), flagellum projecting externally, sinuate in shape (Fig. 118). Paramere as illustrated (Fig. 119). FEMALE. Tergite 8 truncate apically (Fig. 123); sternite 8 rounded apically (Fig. 124); spermatheca as illustrated (Fig. 122).

Bionomics. Macrohabitat: mixed forest, hardwood forest, on ridge with red oak in silver maple forest, oak and red maple forest, and spruce forest. **Microhabitat:** on/in gilled mushrooms on forest floor, on decaying fleshy mushroom (one adult). **Collecting period:** August and September. **Collecting method:** sifting mushrooms and aspirating specimens.

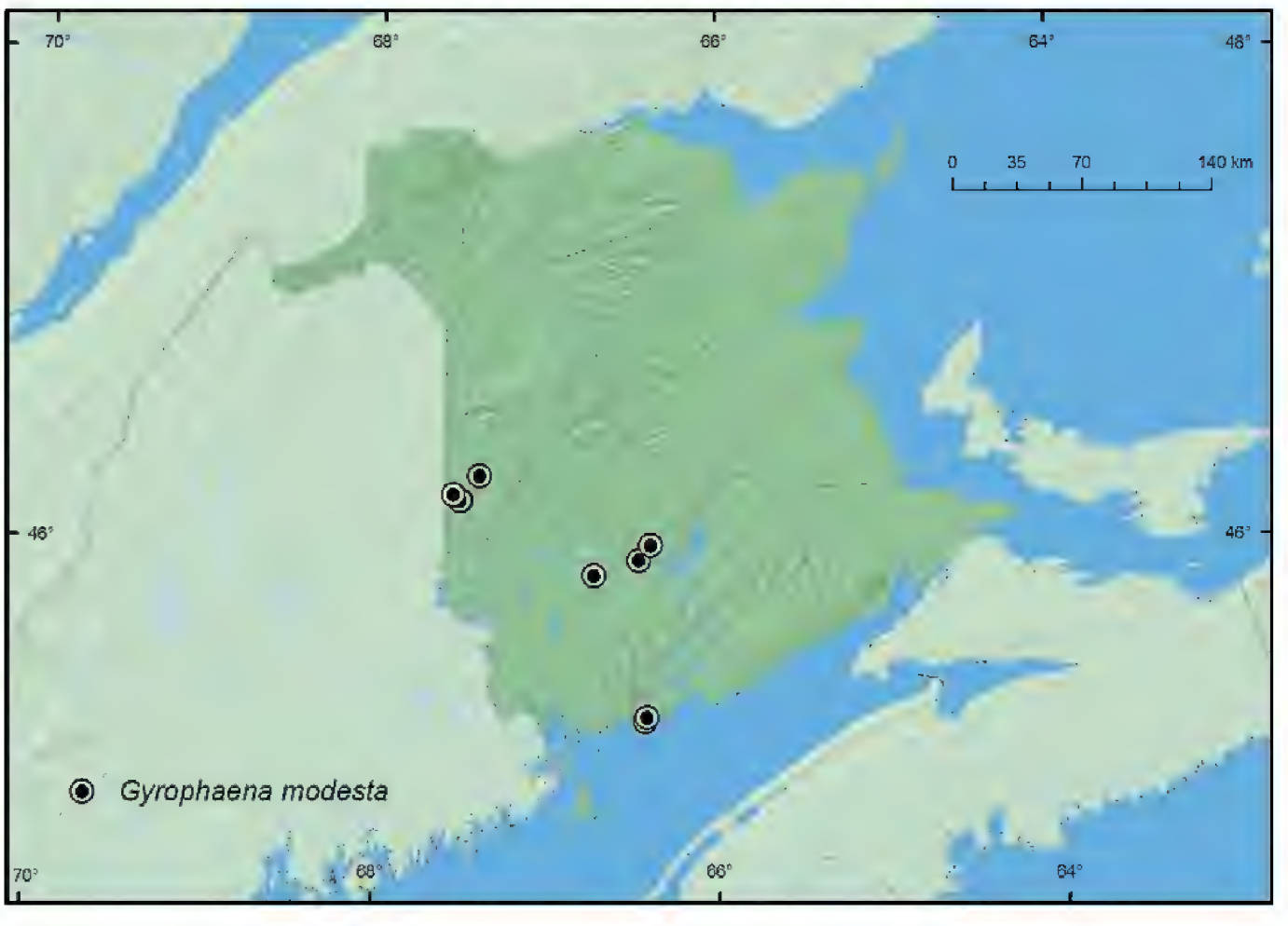
Distribution (Map 15). CANADA: **New Brunswick**; UNITED STATES: District of Columbia, Indiana, Michigan, New York, Pennsylvania, Virginia, and West Virginia.

20. *Gyrophaena* (*Gyrophaena*) *modesta* Casey

Figs 19, 125–131; Map 16

Gyrophaena modesta Casey, 1906: 296; Seevers 1951: 710; Moore and Legner 1975: 430; Campbell and Davies 1991: 106.

Description. Body length 1.8–2.0 mm, narrowly subparallel; head rufo-piceous; pronotum flavate; elytra flavate with slightly darker irregularly distributed small spots;



Map 16. Collection localities in New Brunswick, Canada of *Gyrophaena modesta*

abdomen rufo-flavate, apical part of abdomen often darker. Punctation: vertex of head with about 10 large umbilicate punctures on each side, pronotum with about nine large punctures in two median rows and additional punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout except for pronotum, most evident on head. Antennae as illustrated (Fig. 19). Pronotum 1.5 times as wide as long. MALE: tergite 8 with two lateral lobes and one or two small median teeth or teeth absent, apical margin of disc slightly emarginate (Fig. 127); sternite 8 rounded apically (Fig. 128). Median lobe of aedeagus with narrowly elongate tubus bearing one short ventral projection with blunt apex; flagellum extended and long, sinuate in shape (Fig. 125). Paramere as illustrated (Fig. 126). FEMALE. Tergite 8 truncate apically (Fig. 130); sternite 8 rounded apically (Fig. 131); spermatheca as illustrated (Fig. 129).

Bionomics. Macrohabitat: Mixed forest, hardwood forest, red spruce forest, red spruce and yellow birch forest, mature red spruce and red maple forest, mature red spruce and eastern white cedar forest, oak and red maple forest. This species has been collected in association with grasses**. Microhabitat:** on fresh gilled mushrooms on forest floor, in decaying gilled mushroom (one occurrence), and on *Pleurotus* sp. on log. **Collecting period:** August, September, and October. **Collecting method:** sifting mushrooms, aspirating, and hand collecting specimens.

Distribution (Map 16). CANADA: New Brunswick; UNITED STATES: Illinois, Indiana, Michigan, Minnesota, New Hampshire, and New York.

IX. *Gyrophaena* (*Gyrophaena*) *fuscicollis* species group (Seevers, 1951: 712)

21. *Gyrophaena* (*Gyrophaena*) *fuscicollis* Casey

Figs 20,132–138; Map 17

Gyrophaena (*Gyrophaena*) *fuscicollis* Casey, 1906: 296; Seevers 1951: 712; Moore and Legner 1975: 429.

Description. Body length 2.0–2.4 mm, narrowly subparallel; head black; pronotum fuscous; elytra flavate with slightly darker small spots near scutellum; abdomen rufo-testaceous, apical portion of abdomen often slightly darker. Punctation: vertex of head with a few moderately-sized umbilicate punctures on each side, pronotum with two median rows of confused punctures and additional punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout except for pronotum, most evident on head. Antennae as illustrated (Fig. 20). Pronotum 1.2 times as wide as long. MALE: tergite 8 with two lateral lobe-shaped teeth and two small median teeth, apical margin of disc slightly emarginate (Fig. 134); sternite 8 rounded apically (Fig. 135). Median lobe of aedeagus with narrowly elongate tubus and hooked apex, bearing one long ventral projection (Fig. 132), apical projection of internal sac elongate with long and everted flagellum (Fig. 132). Paramere as illustrated (Fig. 133). FEMALE. Tergite 8 truncate apically (Fig. 137); sternite 8 rounded apically (Fig. 138); spermatheca with a small capsule and a long, U-shaped stem (Fig. 136).

Map 17. Collection localities in New Brunswick, Canada of *Gyrophaena fuscicollis*

Bionomics. Macrohabitat: mixed forest and hardwood forest with hemlock. This species has also been found in spruce/pine/fir forests (80–120 years old), old deciduous forest, hemlock forest (120+ years old), and in a meadow. **Microhabitat:** in/on gilled mushrooms and small gilled mushrooms on log. This species has also been reported from a rotting mushroom, on *Heterobasidium annosum*, on white fungus on a white birch, on red maple log and in a decayed log. **Collecting period:** July to September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting.

Distribution (Map 17). **CANADA: New Brunswick**; UNITED STATES: District of Columbia, Illinois, New York, Pennsylvania, and Wisconsin

XII. *Gyrophaena* (*Gyrophaena*) *vitrina* species group (Seevers, 1951: 714)

22. *Gyrophaena* (*Gyrophaena*) *vitrina* Casey

Figs 21, 139–144; Map 18

Gyrophaena (*Gyrophaena*) *vitrina,* Casey 1906: 291; Seevers 1951: 714; Moore and Legner 1975: 433; Campbell and Davies 1991: 107.

Gyrophaena attonsa Casey, 1911: 184. Synonymized by Seevers 1951: 714.

Description. Body length 2.4–3.5 mm, broadly subparallel; head rufo-piceous; pronotum flavate with dark median band; elytra brown with silvery luster; abdomen

Map 18. Collection localities in New Brunswick, Canada of *Gyrophaena vitrina*

flavate, apical portion of abdomen often slightly darker. Punctation: vertex of head with about six moderately-sized umbilicate punctures on each side, pronotum with two median rows of weak punctures and additional punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: not apparent. Antennae as illustrated (Fig. 21). Pronotum 1.5 times as wide as long. MALE: tergite 8 with two lateral teeth and usually two (occasionally four) small median teeth, apical margin slightly emarginate (Fig. 141); sternite 8 produced apically (Fig. 142). Median lobe of aedeagus with narrowly elongate tubus and ventrally produced apex (Fig. 139), projection of internal sac narrowly elongate, flagellum slightly everted (Fig. 139). Paramere as illustrated (Fig. 140). FEMALE. Tergite 8 truncate apically (Fig. 143); sternite 8 produced posteriorly (Fig. 144); spermatheca not found [it may be very small and difficult to find or it is completely reduced].

Bionomics. Macrohabitat: mixed forest, hardwood forest, rich Appalachian hardwood forest, flood plain forest, and eastern white cedar swamps, and mature red spruce and red maple forest. **Microhabitat:** on gilled mushrooms on forest floor, on small gilled mushrooms on side of log, on bracket fungi, and on *Trametes hirsuta* on a poplar log. **Collecting period:** June, July, August, and September. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 18). CANADA: **New Brunswick**, Ontario, and Quebec; UNITED STATES: Illinois, Indiana, Kentucky, Maine, Michigan, New York, North Carolina, Pennsylvania, Tennessee, West Virginia, and Wisconsin.

XIII. *Gyrophaena* (*Gyrophaena*) *bihamata* species group (Seevers, 1951: 717)

23. *Gyrophaena* (*Gyrophaena*) *uteana* Casey

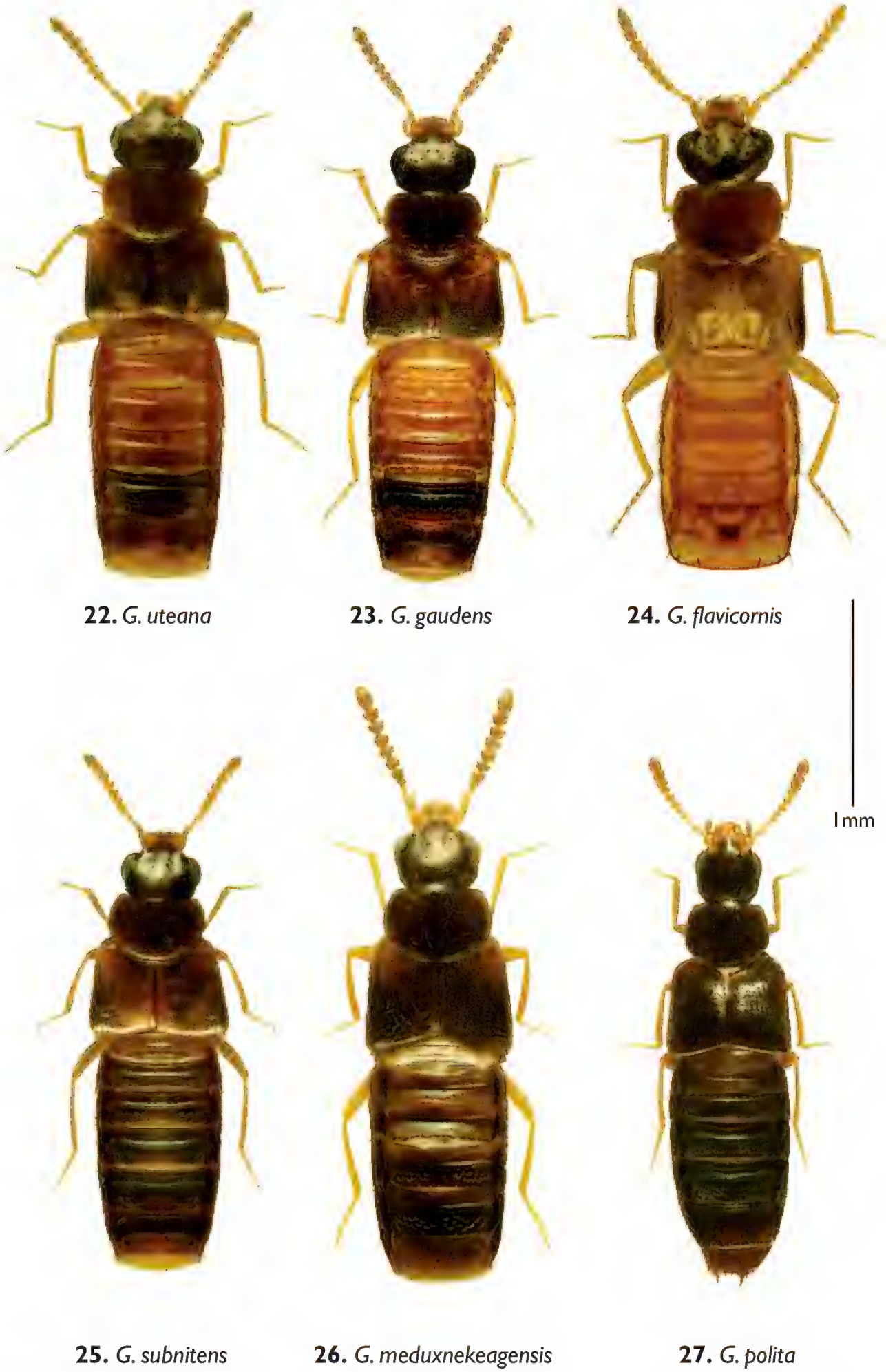
Figs 22, 145–151; Map 19

Gyrophaena (*Gyrophaena*) *uteana* Casey, 1906: 292; Seevers 1951: 718; Moore and Legner 1975: 432; Campbell and Davies 1991: 107.
Gyrophaena pacifica Casey, 1906: 293. Synonymized by Seevers 1951: 718.

Description. *Gyrophaena uteana* is externally similar to *G. gaudens* but the latter species has infuscated antennae while the former has antennae approximately uniformly light yellow.

Body length 1.4–1.7 mm, narrowly oval; head piceous; pronotum brown to piceous; elytra brown or reddish-brown with piceous sutural region and posterior angles; abdomen reddish-brown, apical part often darker and piceous. Punctation: vertex of head with at least six moderately-sized umbilicate punctures on each side, pronotum with six punctures in two confused median rows and additional punctures elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout except for pronotum, most evident on head. Antennae as illustrated (Fig. 22). Pronotum 1.5 times as wide as long. MALE: tergite 8 with two long and narrow lateral teeth and two very small median teeth close to each other (Fig. 147); sternite 8 rounded apically (Fig. 148). Median lobe of aedeagus with long and narrowly produced tubus bearing large angular swelling in the

Map 19. Collection localities in New Brunswick, Canada of *Gyrophaena uteana*



22. *G. uteana* **23.** *G. gaudens* **24.** *G. flavicornis*

25. *G. subnitens* **26.** *G. meduxnekeagensis* **27.** *G. polita*

Figures 22–27. *Gyrophaena* species in dorsal view (apical part of abdomen removed): **22** *G.* (*G.*) *uteana* Casey **23** *G.* (*G.*) *gaudens* Casey **24** *G.* (*G.*) *flavicornis* Melsheimer **25** *G.* (*P.*) *subnitens* Casey **26** *G.* (*P.*) *meduxnekeagensis* Klimaszewski and Webster, sp. n. and **27** *G.* (*P.*) *polita* (Gravenhorst).

middle of ventral margin, apex with subapical minute projection (Fig. 145), apical projection of internal sac elongate and irregular in shape (Fig. 145). Paramere as illustrated (Fig. 146). FEMALE. Tergite 8 truncate apically (Fig. 150); sternite 8 rounded apically and slightly pointed (Fig. 151); spermatheca as illustrated (Fig. 149).

Bionomics. Macrohabitat: mixed forest, on ridge with red oaks surrounded by a silver maple forest, mature red spruce and red maple forest. **Microhabitat:** in/on gilled mushrooms and on bracket fungi. **Collecting period:** June, August and September. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 19). CANADA: **New Brunswick**, Quebec, and British Columbia; UNITED STATES: California, Colorado, and Utah.

24. *Gyrophaena* (*Gyrophaena*) *gaudens* Casey

Figs 23, 152–158; Map 20

Gyrophaena (*Gyrophaena*) *gaudens* Casey, 1906: 292; Seevers 1951: 719; Moore and Legner 1975: 429; Campbell and Davies 1991: 106.

Description. *Gyrophaena gaudens* is externally similar to *G. uteana* but differs by infuscated antennae and the male genital features.

Map 20. Collection localities in New Brunswick, Canada of *Gyrophaena gaudens*

Body length 1.4–1.7 mm, narrowly oval; head piceous; pronotum dark rufo-testaceous to piceous; elytra reddish-brown with piceous sutural region and posterior angles; abdomen yellowish- or reddish-brown, apical portion often darker and piceous. Punctation: vertex of head with at least six moderately-sized umbilicate punctures on each side, pronotum with six punctures in two confused median rows and additional punctures elsewhere, elytra with fine and sparse punctures. Microsculpture: reticulate throughout, weaker on pronotum, most evident on head. Antennae as illustrated (Fig. 23). Pronotum 1.5 times as wide as long. MALE: tergite 8 with two long and narrow lateral teeth and with two (rarely three) minute median teeth [smaller and more sharply pointed than those of *G. uteana*] (Fig. 154); sternite 8 rounded apically (Fig. 155). Median lobe of aedeagus with long and narrowly produced tubus which is lacking angular swelling in the middle of ventral margin, apex with subapical minute projection (Fig. 152), apical projection of internal sac elongate and irregular in shape (Fig. 152). Paramere as illustrated (Fig. 153). FEMALE. Tergite 8 truncate apically (Fig. 157); sternite 8 rounded apically and slightly pointed (Fig. 158); spermatheca as illustrated (Fig. 156).

Bionomics. Macrohabitat: mixed forest and conifer forest. **Microhabitat:** on/in gilled mushrooms, on small gilled mushroom on log, on *Pleurotus* sp. on dead standing *Populus tremuloides*, on polypore fungi, and on bracket fungi. This species has also been found on *Cantharellus deliciosus*. **Collecting period:** June, July, and August. **Collecting method:** sifting mushrooms, aspirating, and hand collecting.

Distribution (Map 20). CANADA: **New Brunswick**, Ontario, and Quebec; UNITED STATES: Illinois, Indiana, Massachusetts, Michigan, Pennsylvania, and Wisconsin.

25. *Gyrophaena* (*Gyrophaena*) *flavicornis* Melsheimer

Figs 24, 159–165; Map 21

Gyrophaena (*Gyrophaena*) *flavicornis* Melsheimer, 1844: 31; Seevers 1951: 722; Moore and Legner 1975: 429; Campbell and Davies 1991: 106.

Description. Body length 2.0–2.7 mm, broadly subparallel; head piceous; pronotum light to dark reddish-brown; elytra flavo-testaceous or reddish-brown with some small darker spots laterally and in scutellar region; abdomen reddish-brown, apical portion often darker. Punctation: vertex of head with at least 10 moderately-sized coarse punctures on each side, pronotum with two median rows of coarse punctures and additional punctures scattered elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout but weaker on elytra. Antennae as illustrated (Fig. 24). Pronotum 1.4 times as wide as long. MALE: tergite 8 with two small lateral teeth and usually with two minute median teeth (occasionally only one tooth present or the teeth reduced to small tuberosities), apical margin slightly emarginate medially (Fig. 161); sternite 8 rounded apically (Fig. 162). Median lobe of aedeagus with complex tubus, its apex

Map 21. Collection localities in New Brunswick, Canada of *Gyrophaena flavicornis*

with subapical hook-like projection (Fig. 159), apical projection of internal sac elongate and truncate apically (Fig. 159). Paramere as illustrated (Fig. 160). FEMALE. Tergite 8 truncate apically (Fig. 164); sternite 8 slightly produced apically (Fig. 165); spermatheca as illustrated (Fig. 163).

Bionomics. Macrohabitat: Mixed forest, hardwood forest, rich Appalachian hardwood forest, red oak and red maple forest, 8.5-year-old regenerating mixed forest, mature red spruce and red maple forest. **Microhabitat:** on/in gilled mushrooms on forest floor, in gilled mushroom on stump, on *Pleurotis* species growing on a log, and in *Porodaedalea piceina* (Peck) Niemalä on dead standing beech tree. This species has also been found in decaying mushrooms, on white fungus on white birch. **Collecting period:** June, July, August, and September. **Collecting method:** sifting mushrooms, aspirating, and hand collecting.

Distribution (Map 21). CANADA: **New Brunswick**, **Nova Scotia,** Ontario, and Quebec; UNITED STATES: District of Columbia, Illinois, Indiana, Kentucky, Maine, Massachusetts, Michigan, New Hampshire, North Carolina, Maryland, New Jersey, New York, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Wisconsin, and West Virginia.

XIV. Subgenus *Phaenogyra* Mulsant & Rey, 1872: 76

Figs 25–28, 166–191

Type species: *Gyrophaena strictula* Erichson, 1839.

Description. Body approximately uniformly dark brown (Figs 25–28); integument with strong reticular microsculpture; elytra densely aspirate; mesosternum margined; antennae short and compact with articles 5–10 transverse; postocular area of head often elongate; male median lobe of aedeagus distinctly shaped (Figs 166, 173, 180, 184, 185) (Seevers 1951).

XII. *Gyrophaena (Phaenogyra) strictula* species group (Seevers, 1951: 724)

27. *Gyrophaena (Phaenogyra) subnitens* Casey

Figs 25, 166–172; Map 22

Gyrophaena (Phaenogyra) subnitens Casey, 1906: 302; Seevers 1951: 725; Campbell and Davies 1991: 107.

Description. Body length 1.5–2.2 mm, approximately uniformly dark brown, elytra may have some paler irregular small spots, base of abdomen sometimes slightly paler than rest of abdomen. Punctation: vertex of head with at least six moderately-sized coarse punctures on each side, pronotum with two median rows of coarse punctures and additional punctures scattered elsewhere, elytra with fine and sparse punctures. Microsculpture: reticulate throughout but weaker on pronotum. Antennae light yellow (Fig. 25). Pronotum 1.5 times as wide as long. MALE: tergite 8 with two large lateral teeth, and two small median teeth present or absent, apical margin of disc slightly emarginate medially (Fig. 168); sternite 8 rounded apically (Fig. 169). Median lobe of aedeagus with elongate and apically divided tubus (Fig. 166), apical projection of internal sac arcuate (Fig.

Map 22. Collection localities in New Brunswick, Canada of *Gyrophaena subnitens*

166). Paramere as illustrated (Fig. 167). FEMALE. Tergite 8 truncate apically (Fig. 171); sternite 8 broadly rounded apically (Fig. 172); spermatheca as illustrated (Fig. 170).

Bionomics. Macrohabitat: 8.5-year-old regenerating mixed forest and a red oak forest**. Microhabitat**: gilled mushrooms (sun-exposed) on stump. **Collecting period**: June. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 22). CANADA: **New Brunswick**, Ontario, and Manitoba; UNITED STATES: Illinois, Kansas, Maine, Michigan, Minnesota, Missouri, New York, and Wisconsin.

Comments. *Gyrophaena subnitens* is similar externally to *G. meduxnekeagensis* but may be distinguished from the latter species by paler, light-yellow antennae, short elytra (Fig. 25), and the shape of tubus of median lobe of aedeagus without basal swelling (Fig. 166). From Palaearctic *G. polita* (Gravenhorst) (Figs 27, 180–183), it differs in having a lighter body coloration, shorter and more rapidly converging postocular temples of head, and broader pronotum (Fig. 25). The genital structures are generally similar in these species.

28. *Gyrophaena (Phaenogyra) meduxnekeagensis* Klimaszewski & Webster, sp. n.

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Figs 26, 173–179; Map 23

HOLOTYPE (male): CANADA, New Brunswick, Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve, 46.1907°N, 67.6740°W, 19 July 2006, R.P. Webster coll., mature mixed forest, on small white gilled mushroom on side of decaying log (LFC). **PARATYPES**: CANADA, New Brunswick, Carleton Co., Jackson Falls, "Bell Forest Preserve", 46.2199°N, 67.7232°W, 6 May 2007, R.P. Webster coll., hardwood forest, in partially dried polypore fungus on dead standing *Populus tremuloides* (RWC) 1 male, 1 female; New Brunswick, Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve, 46.1940°N, 67.6800°W, 3 July 2006, R.P. Webster coll., mixed forest, on *Pleurotus* sp. on dead standing *Populus tremuloides* (RWC) 1 sex not determined; New Brunswick, York Co., 8.4 km W of Tracy, off Rt. 645, 45.0871°N, 66.7871°W, 6 May 2008, R.P. Webster coll., wet alder swamp in fleshy polypore fungus at base of standing dead *Populus tremuloides* (RWC) 1 male; Quebec, Bellechasse Co., St. Raphael, 46.8078°N, 70.7344°W, 15 July 2006, R.P. Webster coll., mixed forest, on *Pleurotus* sp. on dead standing *Populus tremuloides* (LFC) 1 male, 1 female, (RWC) 2 males, 1 female.

Etymology. In reference to Meduxnekeag in the Meduxnekeag Valley Nature Preserve where the type and most of the paratypes were collected. This private protected area, adjacent to the Meduxnekeag River and established by the Meduxnekeag River Valley Association, is home to an unsually high number of rare plant and Coleoptera species. The word "Meduxnekeag" is a Maliseet Indian one meaning "rough or rocky at its mouth" presumably applied to the mouth of the river itself.

Description. Body length 1.5–2.4 mm, approximately uniformly dark brown, elytra may have some paler irregular small spots, base of abdomen sometimes slightly paler than the rest of abdomen. Punctation: vertex of head with at least six moderately-sized coarse punctures on each side, pronotum with two median rows of coarse punctures and additional punctures scattered elsewhere, elytra with fine, sparse punctures. Microsculpture: reticulate throughout but weaker on pronotum. Antennae light yellow-brown to brownish (Fig. 26). Pronotum 1.6 times as wide as long. MALE: tergite 8 with two large lateral teeth, and two small median teeth, which are sometimes substantially reduced in size, apical margin slightly emarginate medially (Fig. 175); sternite 8 rounded apically (Fig. 176). Median lobe of aedeagus with long and apically divided tubus (Fig. 173), its base swollen basally and angular in shape (Fig. 173), apical projection of internal sac arcuate (Fig. 173). Paramere as illustrated (Fig. 174). FEMALE. Tergite 8 truncate apically (Fig. 178); sternite 8 broadly rounded apically (Fig. 179); spermatheca as illustrated (Fig. 177).

Bionomics. Macrohabitat: hardwood forest, mature mixed forest, mixed forest, wet alder (*Alnus* sp.) swamp. **Microhabitat:** on small white gilled mushroom on side of decaying log, and on *Pleurotus* sp. growing on dead standing *Populus tremuloides*, partially dried polypore fungus at base of dead standing *Populus tremuloides*. **Collecting period:** May and July. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 23). **CANADA: New Brunswick and Quebec.**

Map 23. Collection localities in New Brunswick, Canada of *Gyrophaena meduxnekeagensis*

Comments. *Gyrophaena meduxnekeagensis* is similar externally to *G. subnitens* but may be distinguished from the latter species by its darker, light yellowish-brown to brown antennae, long elytra (Fig. 26), and the shape of the tubus of median lobe of aedeagus with a basal swelling (Fig. 173). It differs from Palaearctic *G. polita* (Gravenhorst) (Figs 27, 180–183) by lighter body coloration, shorter and more rapidly converging postocular temples of the head, and broader pronotum (Fig. 26). The genital structures are in general similarly shaped in the two latter species (Figs 173–179, 180–183). Females of *G. meduxnekeagensis* may be confused with those of *G. corruscula* from which they differ externally by their infuscated antennae.

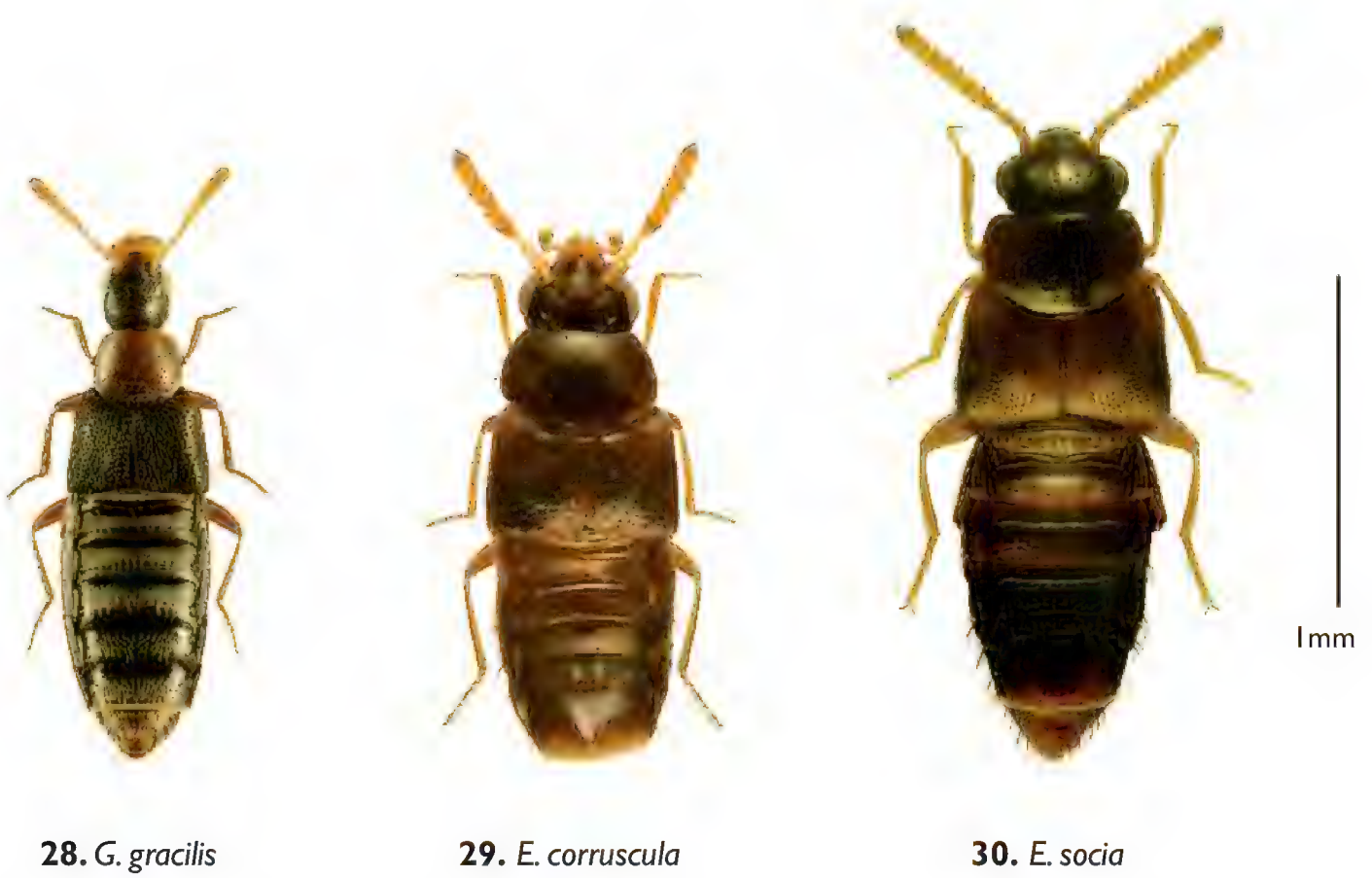
29. *Gyrophaena (Phaenogyra) gracilis* Seevers

Figs 1–3, 28, 184–191; Map 24

Gyrophaena (Phaenogyra) gracilis Seevers, 1951: 727; Moore and Legner 1975: 429.

Description. Body length 1.3–1.5 mm, dark brown with light brown pronotum. Punctation: vertex of head, pronotum and elytra evenly punctate (Fig. 1). Microsculpture: reticulate throughout. Antennae light yellow-brown as illustrated (Fig. 1). Pronotum 1.2 times as wide as long. MALE: tergite 8 with two large lateral teeth, and two small teeth, apical margin slightly emarginate medially (Fig. 182);

Map 24. Collection localities in New Brunswick, Canada of *Gyrophaena gracilis*



Figures 28–30. *Gyrophaena* and *Eumicrota* species in dorsal view (apical part of abdomen removed in Fig. 29): **28** *G.* (*P.*) *gracilis* Seevers **29** *E. corruscula* (Erichson) and **30** *E. socia* (Erichson).

sternite 8 rounded apically (Fig. 183). Median lobe of aedeagus with elongate and apically divided tubus (Figs 184, 185), its base may be slightly swollen basally (Fig. 184), apical projection of internal sac short and irregularly shaped (Figs 184, 185). Paramere as illustrated (Fig. 186). FEMALE. Tergite 8 truncate apically (Fig. 190); sternite 8 broadly rounded apically and pointed medially (Fig. 191); spermatheca as illustrated (Fig. 189). Despite its distinctive external morphology, *G. gracilis* has genital structures very similar to those of *G. meduxnekeagensis* and *G. subnitens* (Figs 161–174).

Bionomics. Macrohabitat: Silver maple swamp, flood plain forest, red oak forest. **Microhabitat:** on *Trametes hirsuta* (Wolfen) Pilat growing on *Populus tremuloides* log (two sites), partially dried *Pleurotus* sp. on dead standing trembling aspen (one specimen) and one specimen from nest contents of barred owl (*Strix varia* Barton) nest box with small chicks. **Collecting period:** May, June, and August. **Collecting method:** sifting mushrooms and aspirating specimens.

Distribution (Map 24). **CANADA: New Brunswick**; UNITED STATES: Wisconsin.

Comments. *Gyrophaena gracilis* is externally the most distinctive species of the genus. Unlike other *Gyrophaena* species it has an extremely elongate postocular temple area of the head with sides subparallel for most of its length (Fig. 1), a small, evenly punctate pronotum (Fig. 1) and a swollen abdomen (Figs 1, 2). Adults of this species occurred within the pores of the host mushrooms. The elon-

gate body of this species would appear to be an adaptation allowing this species to enter the pores of its host.

XV. Genus *Eumicrota* Casey, 1906: 280

Figs 29, 30, 192–205

Type species: *Gyrophaena corruscula* Erichson, designated by Fenyes 1918.

Description. Body small 0.6–1.5 mm, uniformly coloured, piceous or brownish-black; pronotum approximately twice as wide as long; mesosternal and metasternal processes of about the same length; antennae compact, antennomeres increasing abruptly in size beyond the 4th article, 5th article conspicuously broader than the 4th, last seven articles form a loose club (Figs 29, 30) (Seevers 1951).

30. *Eumicrota corruscula* (Erichson)

Figs 29, 192–198; Map 25

Gyrophaena corruscula Erichson, 1840: 189; Seevers 1951: 733; Moore and Legner 1975: 428.

Description. Body length 1.0–1.5 mm, dark brown to black. Punctation: vertex of head and pronotum finely and sparsely punctate, elytra finely, asperately punctate, ab-

Map 25. Collection localities in New Brunswick, Canada of *Eumicrota corruscula*

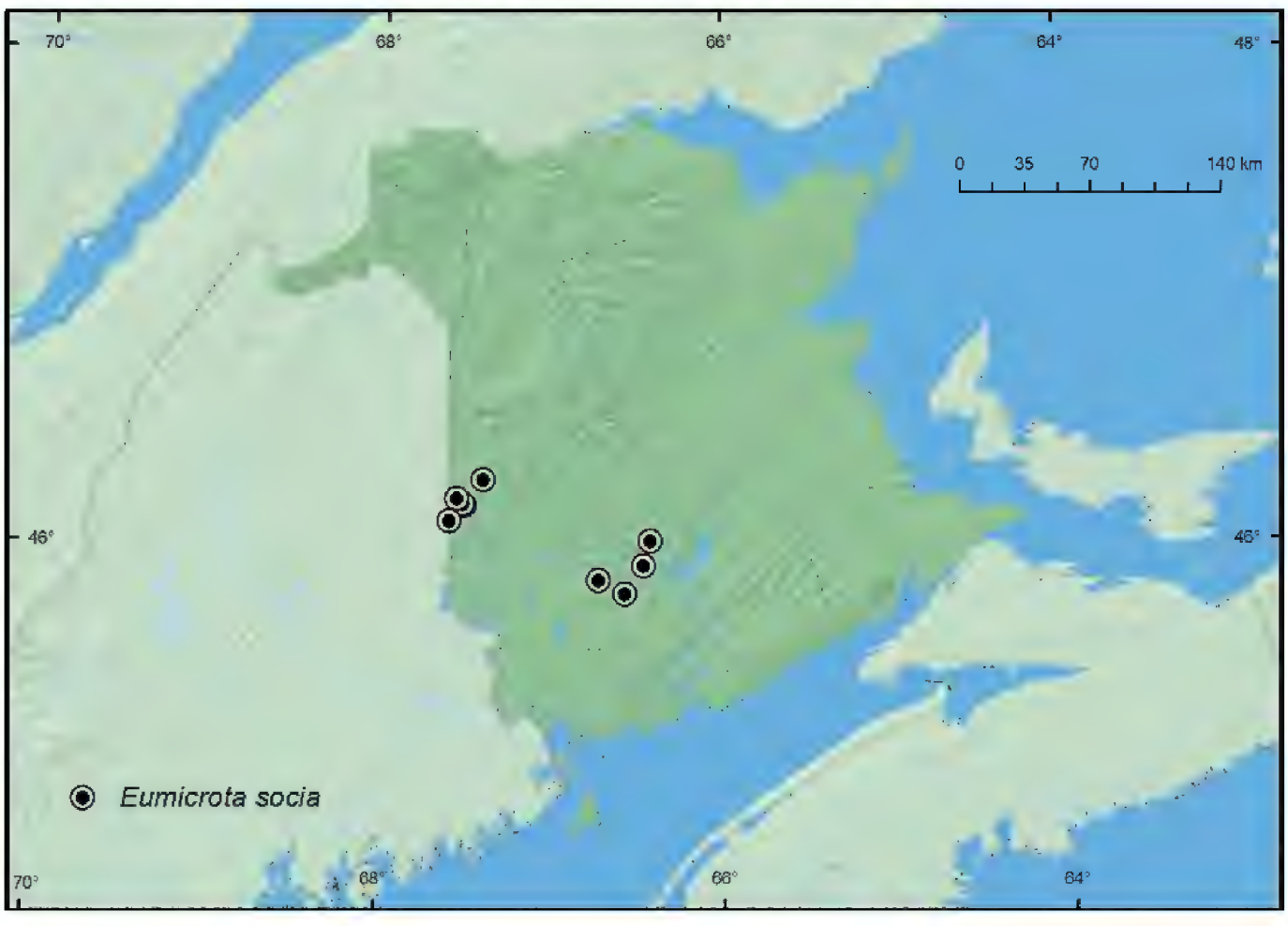
domen sparsely, irregularly punctate (Fig. 29). Microsculpture: reticulate throughout, most evident on elytra. Antennae light yellow-brown as illustrated (Fig. 29). Pronotum 1.5 times as wide as long. MALE. tergite 8 truncate apically with one small median lobe (Fig. 194); sternite 8 rounded apically (Fig. 195). Median lobe of aedeagus with long and narrow tubus bearing thin apical projection directed anteriad (Fig. 192), apical projection of internal sac short and terminated with multiple coiled and everted flagellum (Fig. 192). Paramere as illustrated (Fig. 193). FEMALE. Tergite 8 truncated apically (Fig. 197); sternite 8 broadly rounded apically (Fig. 198); spermatheca as illustrated (Fig. 196).

Bionomics. **Macrohabitat:** hardwood forest, mixed forest. **Microhabitat:** on *Pleurotus* sp., growing on logs, on fleshy polypore mushroom growing on a log, on *Polyporus arcularius* Bat. ex Fr. on trunk of dead hardwood, on slightly decayed polypore on log, on gilled mushroom growing on a log. **Collecting period:** June, August, and September. **Collecting method**: sifting mushrooms, aspirating and hand collecting specimens.

Distribution (Map 25). CANADA: **New Brunswick** and Quebec; UNITED STATES: Alabama, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, Missouri, New Jersey, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin.

31. *Eumicrota socia* (Erichson)

Figs 30, 199–205; Map 26



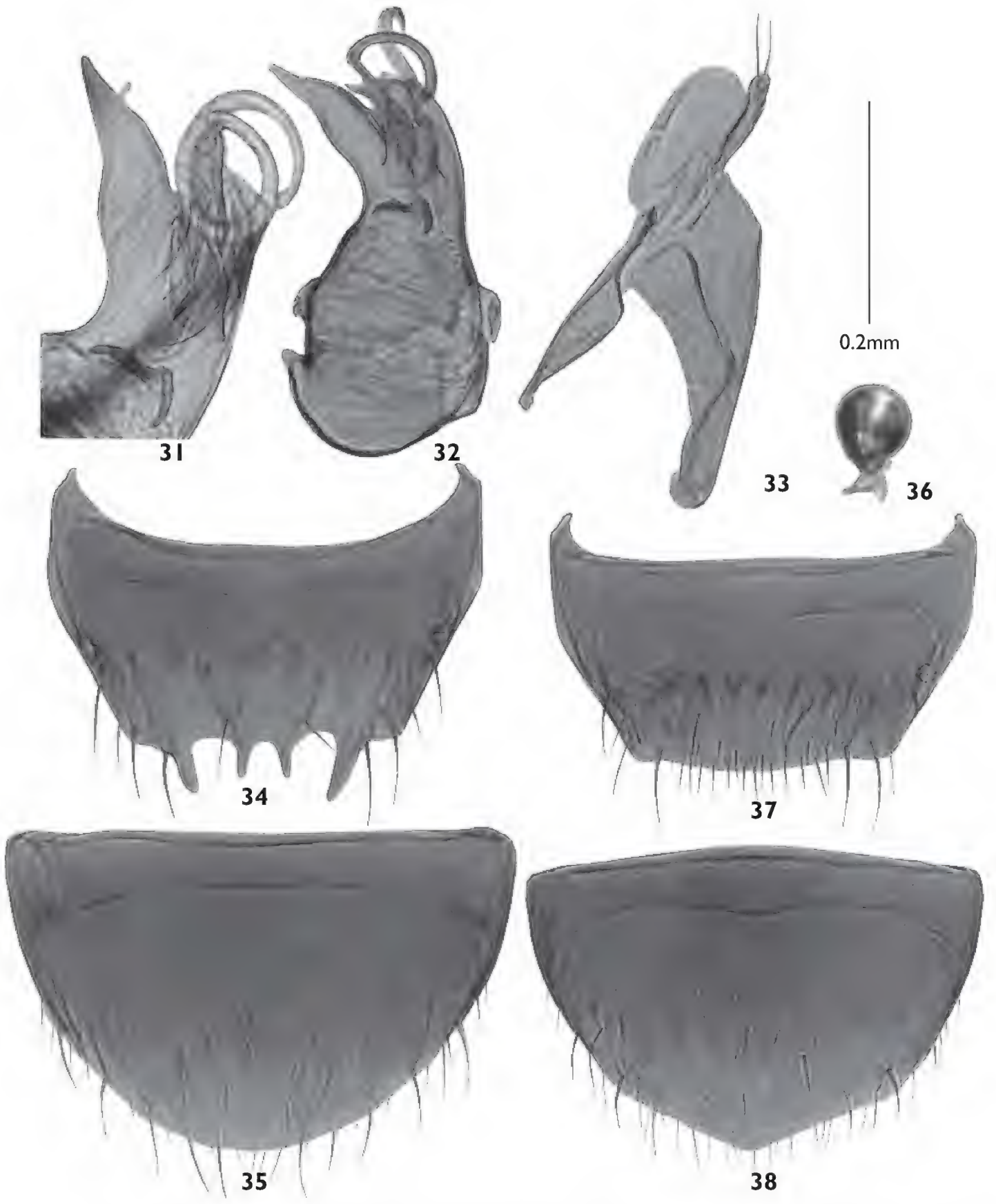
Map 26. Collection localities in New Brunswick, Canada of *Eumicrota socia*

Gyrophaena socia Erichson, 1840: 189; Casey 1906: 281; Seevers 1951: 733; Moore and Legner 1975: 432.
Eumicrota socia Erichson, 1840: 189.
Eumicrota socia Casey, 1906: 282. Synonymized by Seevers 1951: 733.
Eumicrota humeralis Casey, 1906: 282. Synonymized by Seevers 1951: 733.
Eumicrota texanella Casey, 1906: 282. Synonymized by Seevers 1951: 733.
Eumicrota melania Casey, 1906: 283. Synonymized by Seevers 1951: 733.
Eumicrota pallidula Casey, 1906: 283. Synonymized by Seevers 1951: 733.
Eumicrota insolita Notman, 1920: 719. Synonymized by Seevers 1951: 733.

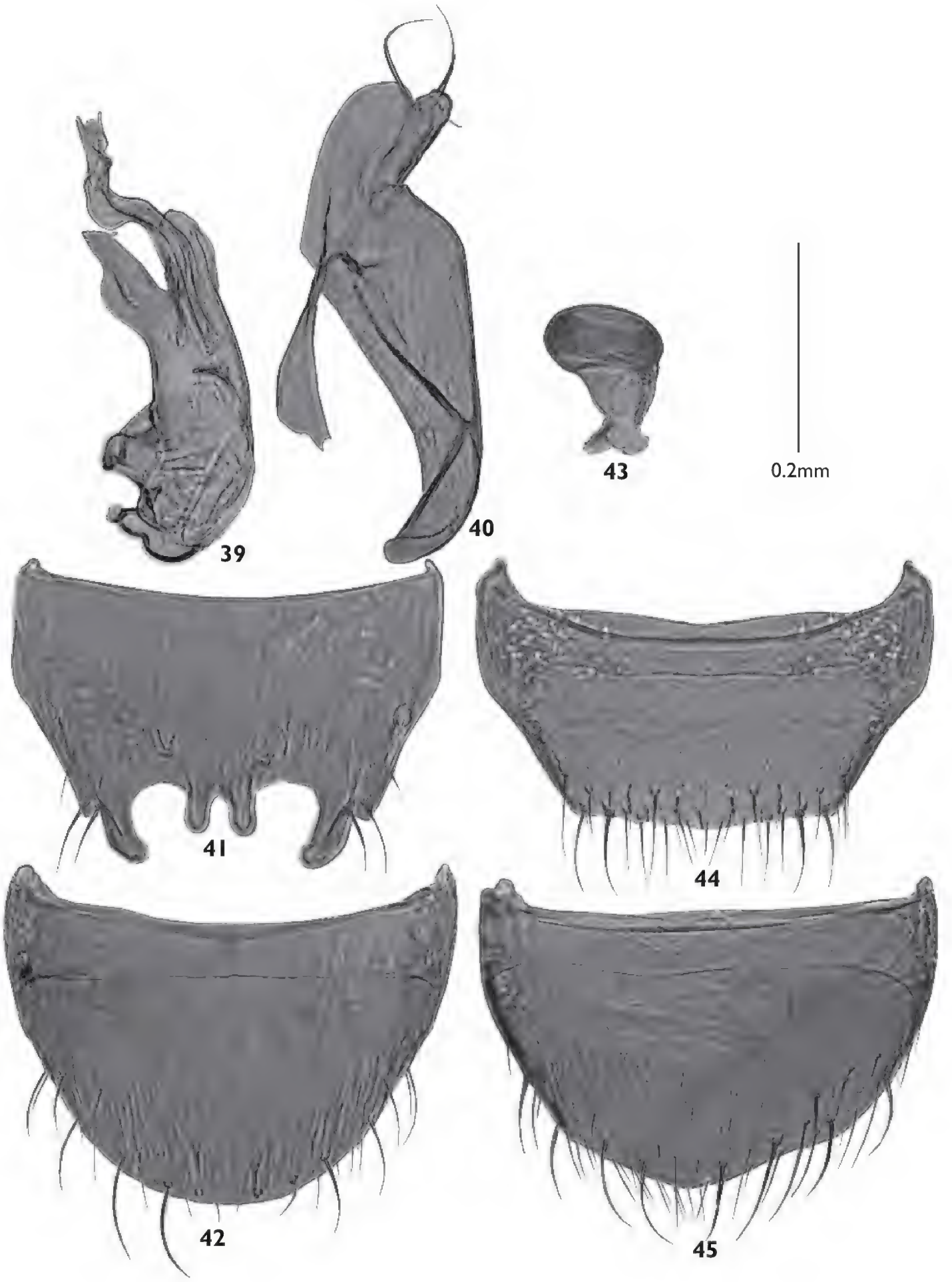
Description. Body length 1.2–1.7 mm, dark brown to black, entire elytra or their posterior part frequently paler (Fig. 30). Punctation: vertex of head and pronotum, elytra, and pronotum moderately coarsely punctate, abdomen sparsely, irregularly punctate (Fig. 30). Microsculpture: reticulate throughout, most evident on elytra. Antennae light yellow-brown as illustrated (Fig. 30). Pronotum 1.6 times as wide as long. MALE: tergite 8 with two large median lobes at apical margin (Fig. 201); sternite 8 rounded apically (Fig. 202). Median lobe of aedeagus with long and narrow tubus bearing thin apical projection directed posteriad (Fig. 199), apical projection of internal sac short and terminated with multiple coiled and everted flagellum (Fig. 199). Paramere as illustrated (Fig. 200). FEMALE. Tergite 8 with two apical lobes (Fig. 204); sternite 8 broadly rounded apically and pointed medially (Fig. 205); spermatheca as illustrated (Fig. 203).

Bionomics. Macrohabitat: hardwood forest, mixed forest, silver maple forest, flood plain forest with butternut trees, mature red spruce and red maple forest, and oak forest. This species has also been found in a conifer forest, red spruce forest (80–120 years old), hemlock forest (120+ years old), hemlock/balsam fir/black spruce forest, and stream margin forest. **Microhabitat:** on/in *Pleurotus* sp. on logs and dead standing trembling aspens, in partially dried *Pleurotus* sp. on dead standing sugar maple, in slightly decayed polypore fungi on log, in decaying polypore fungi on dead standing spruce, in bracket fungi, in/on gilled mushrooms on logs and forest floor, on *Climatodon septentrionale* growing on dead standing sugar maple. Also found on *Heterobasidium annosum* on *Picea rubens*. **Collecting period:** June, July, August, and September. **Collecting method:** sifting mushrooms, aspirating and hand collecting specimens.

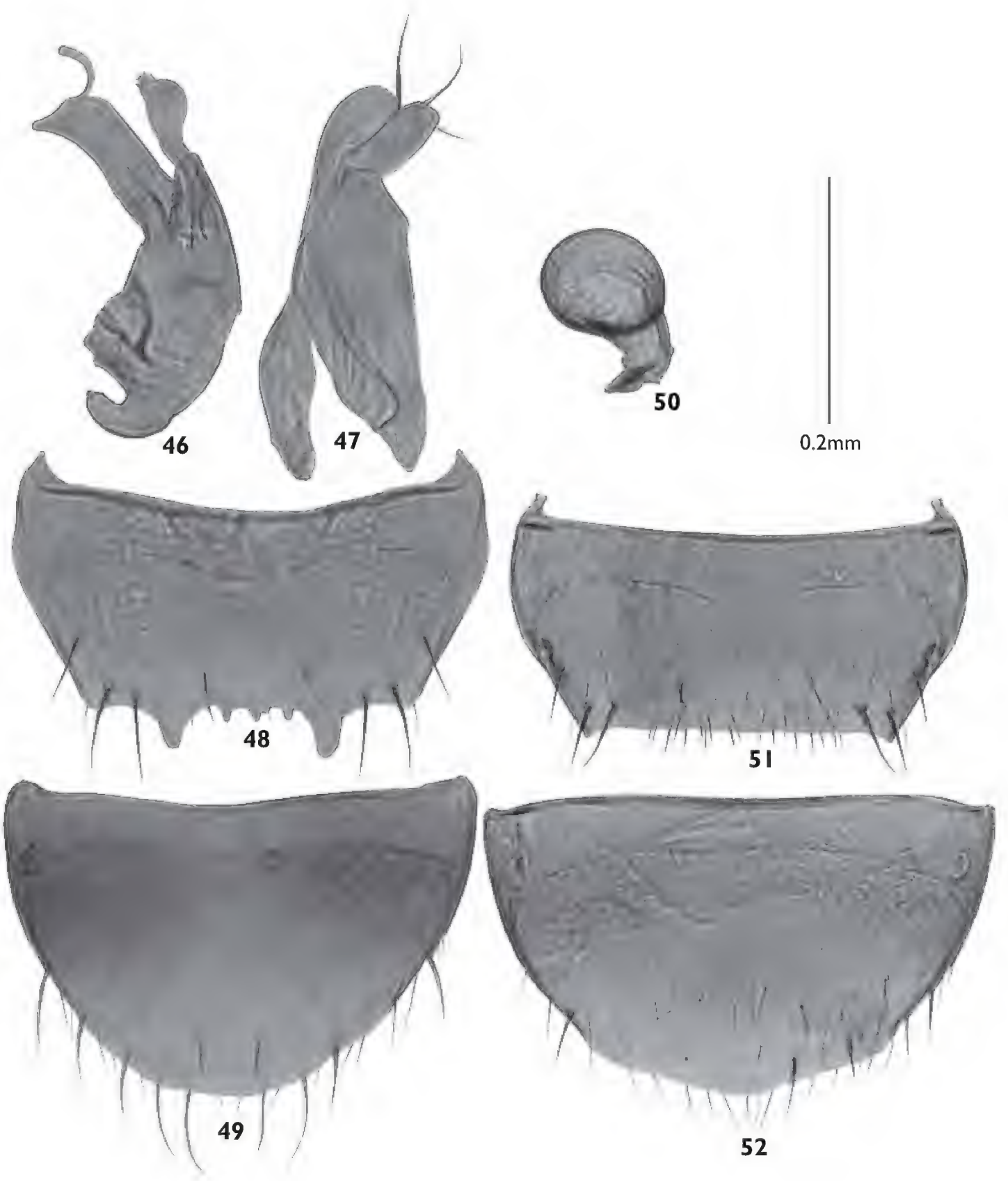
Distribution (Map 26). CANADA: **New Brunswick**, Nova Scotia, and Quebec; UNITED STATES: Arkansas, District of Columbia, Florida, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Missouri, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin.



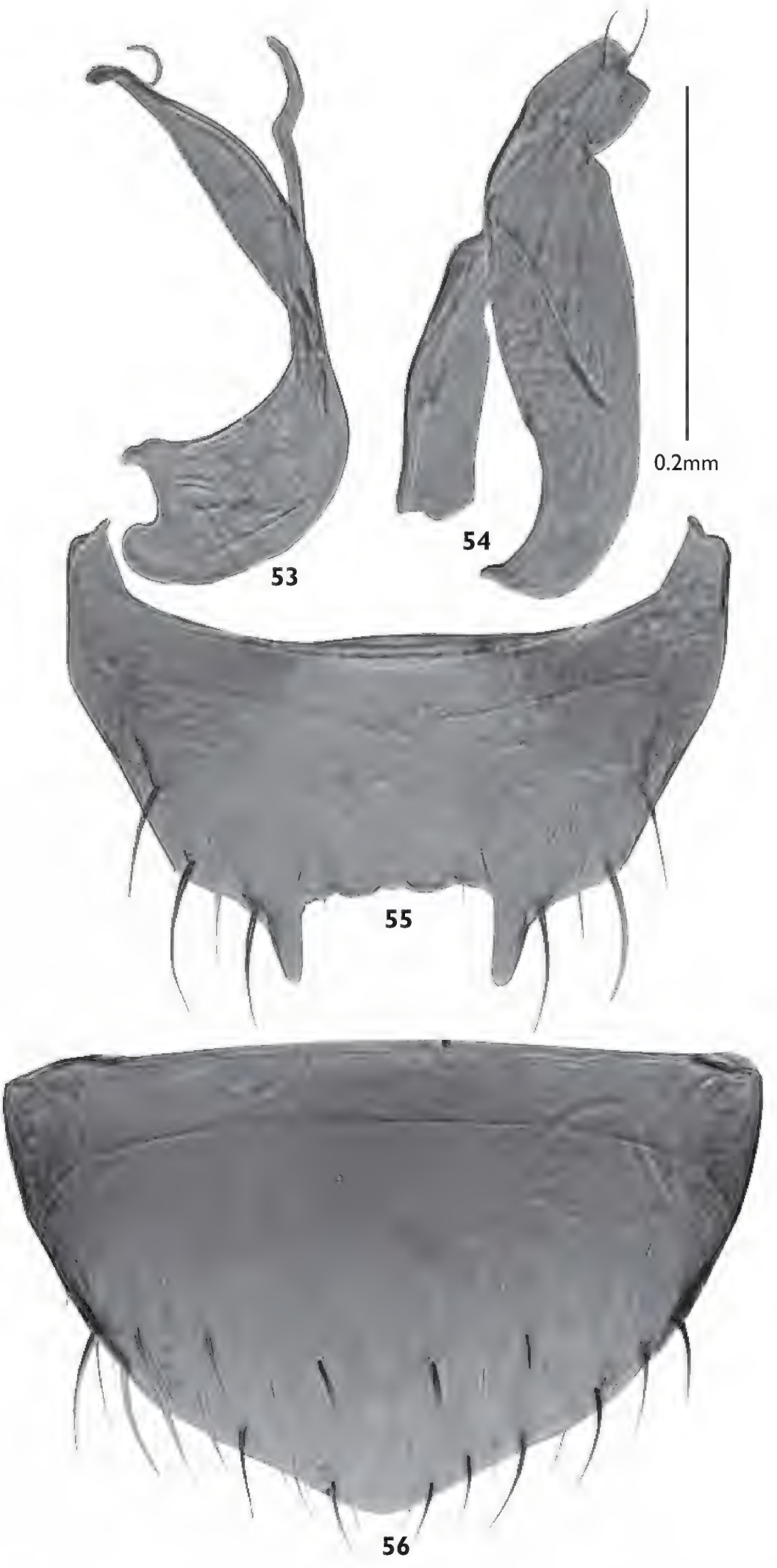
Figures 31–38. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *keeni* Casey: **31** tubus and internal sac in lateral view **32** median lobe of aedeagus in lateral view **33** paramere **34** male tergite 8 **35** male sternite 8 **36** spermatheca **37** female tergite 8 **38** female sternite 8.



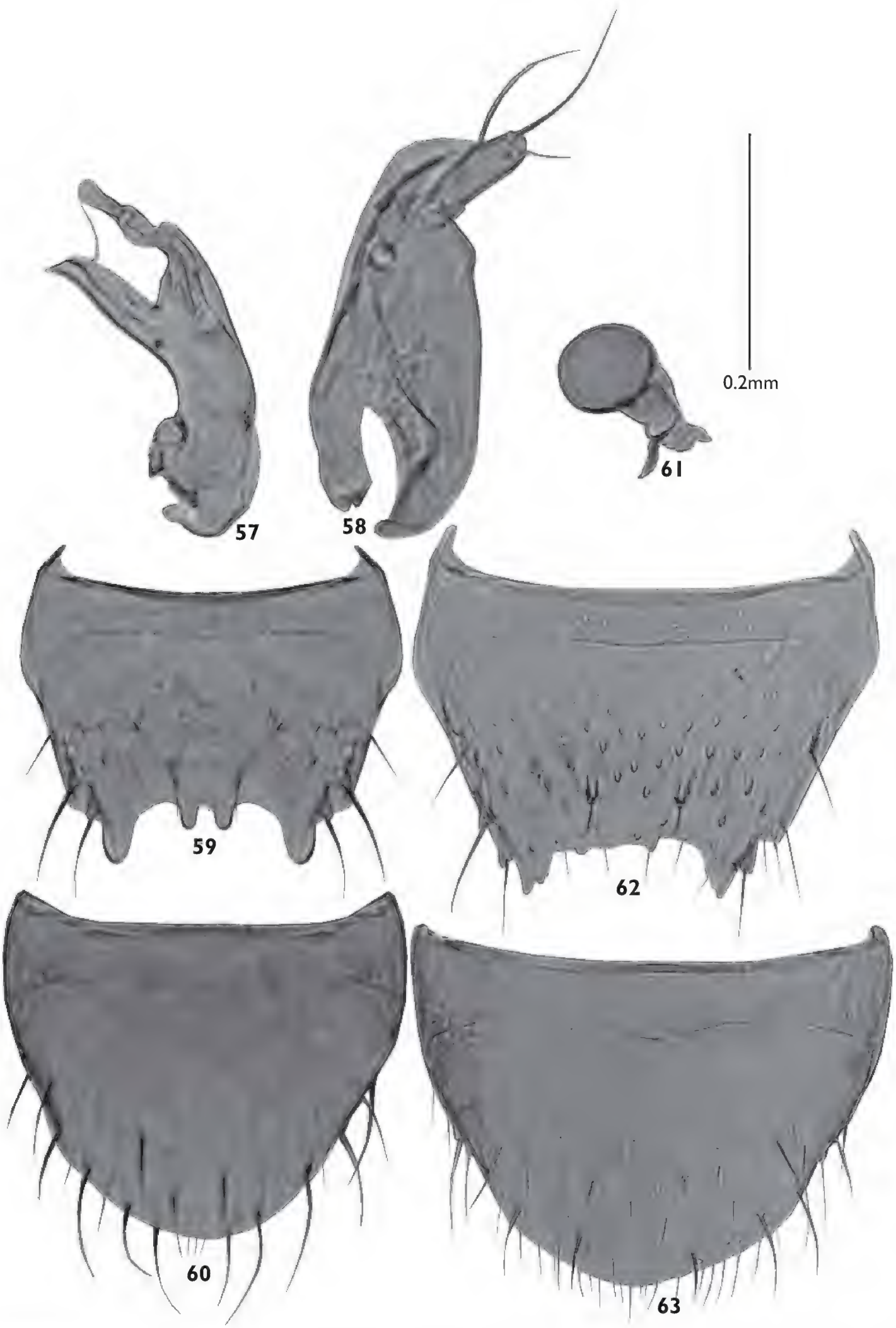
Figures 39–45. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *caseyi* Seevers: **39** median lobe of aedeagus in lateral view **40** paramere **41** male tergite 8 **42** male sternite 8 **43** spermatheca **44** female tergite 8 **45** female sternite 8.



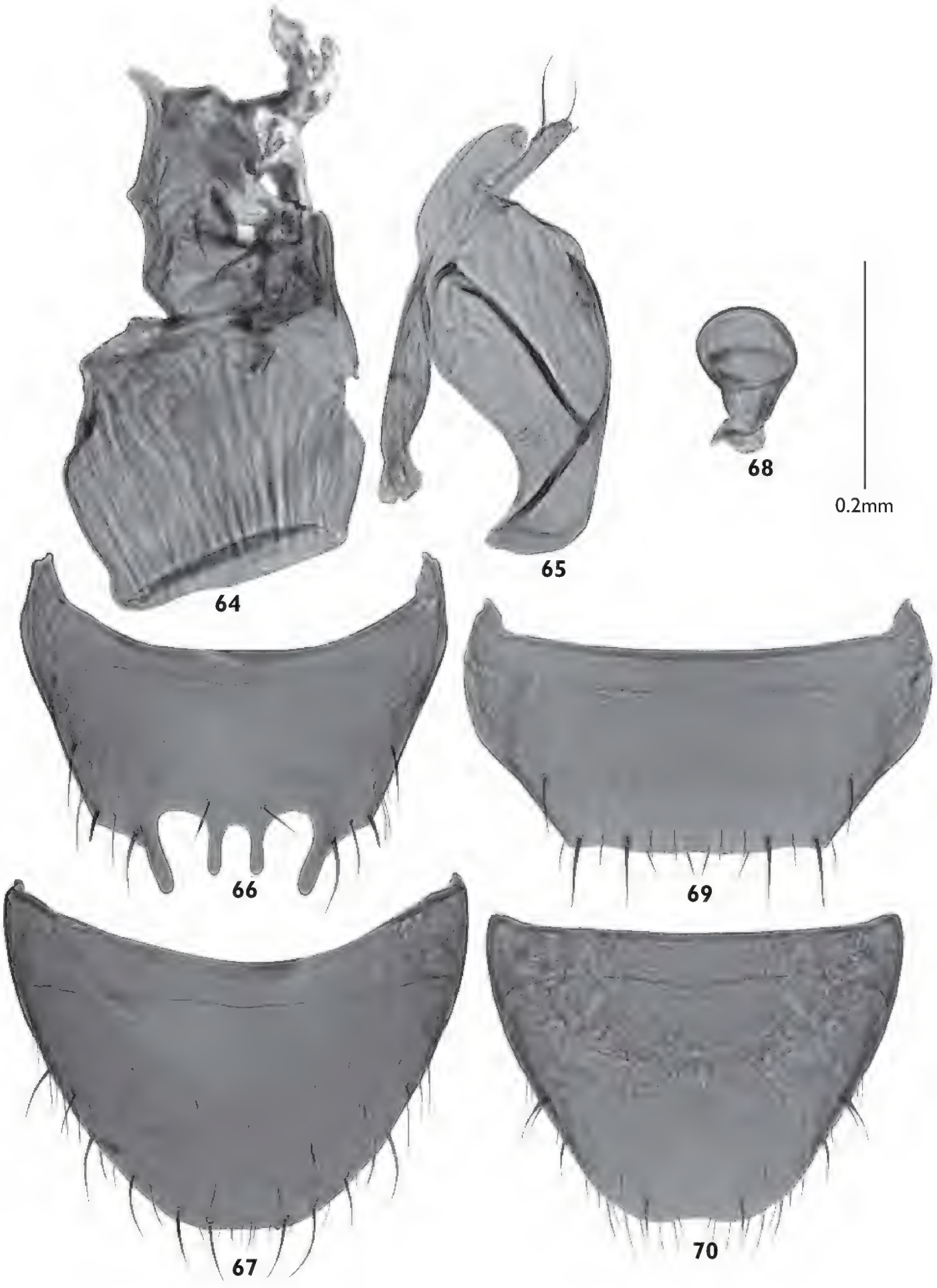
Figures 46–52. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *laetula* Casey: **46** median lobe of aedeagus in lateral view **47** paramere **48** male tergite 8 **49** male sternite 8 **50** spermatheca **51** female tergite 8 **52** female sternite 8.



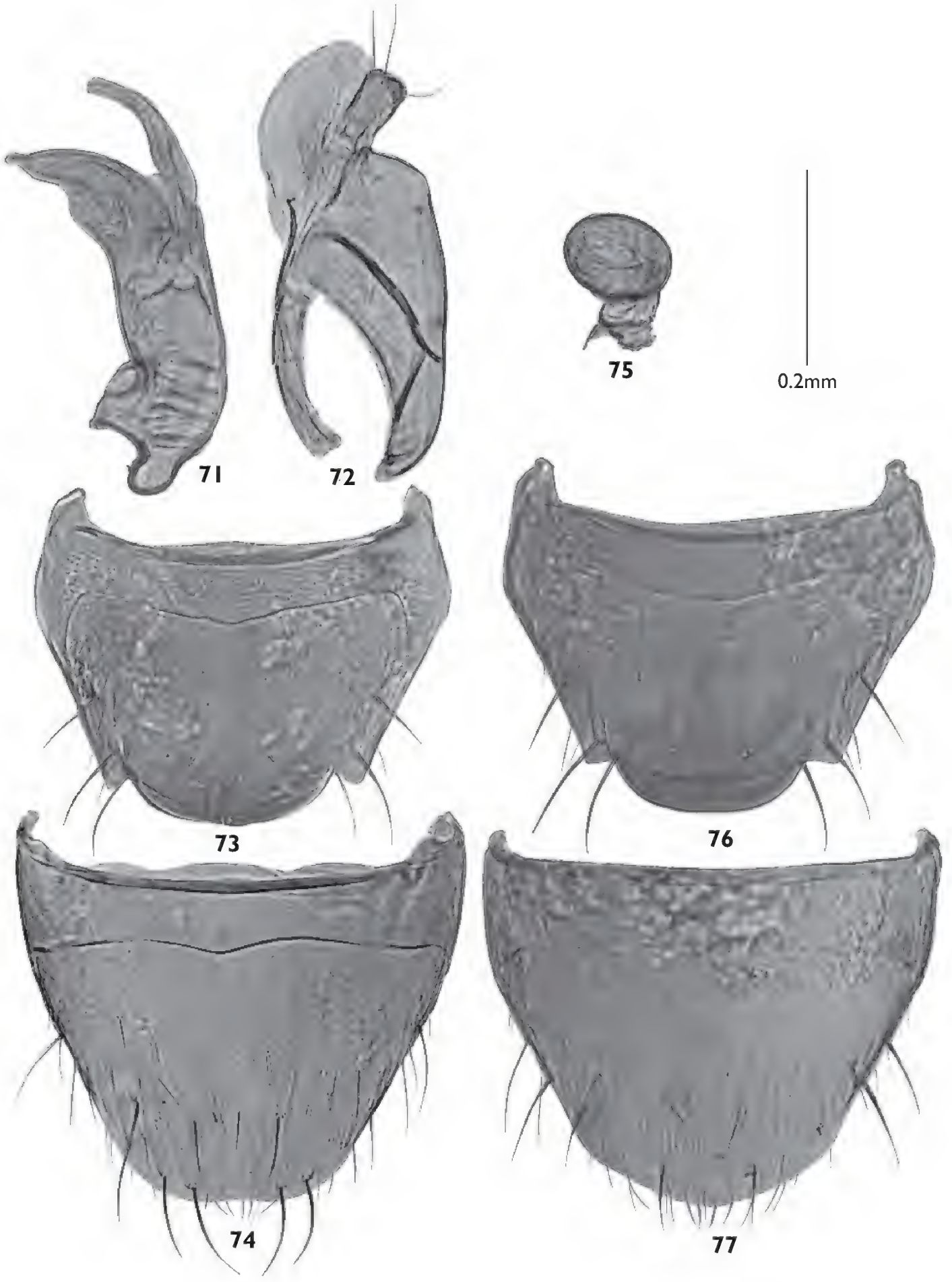
Figures 53–56. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *illiana* Seevers: **53** median lobe of aedeagus in lateral view **54** paramere **55** male tergite 8 **56** male sternite 8.



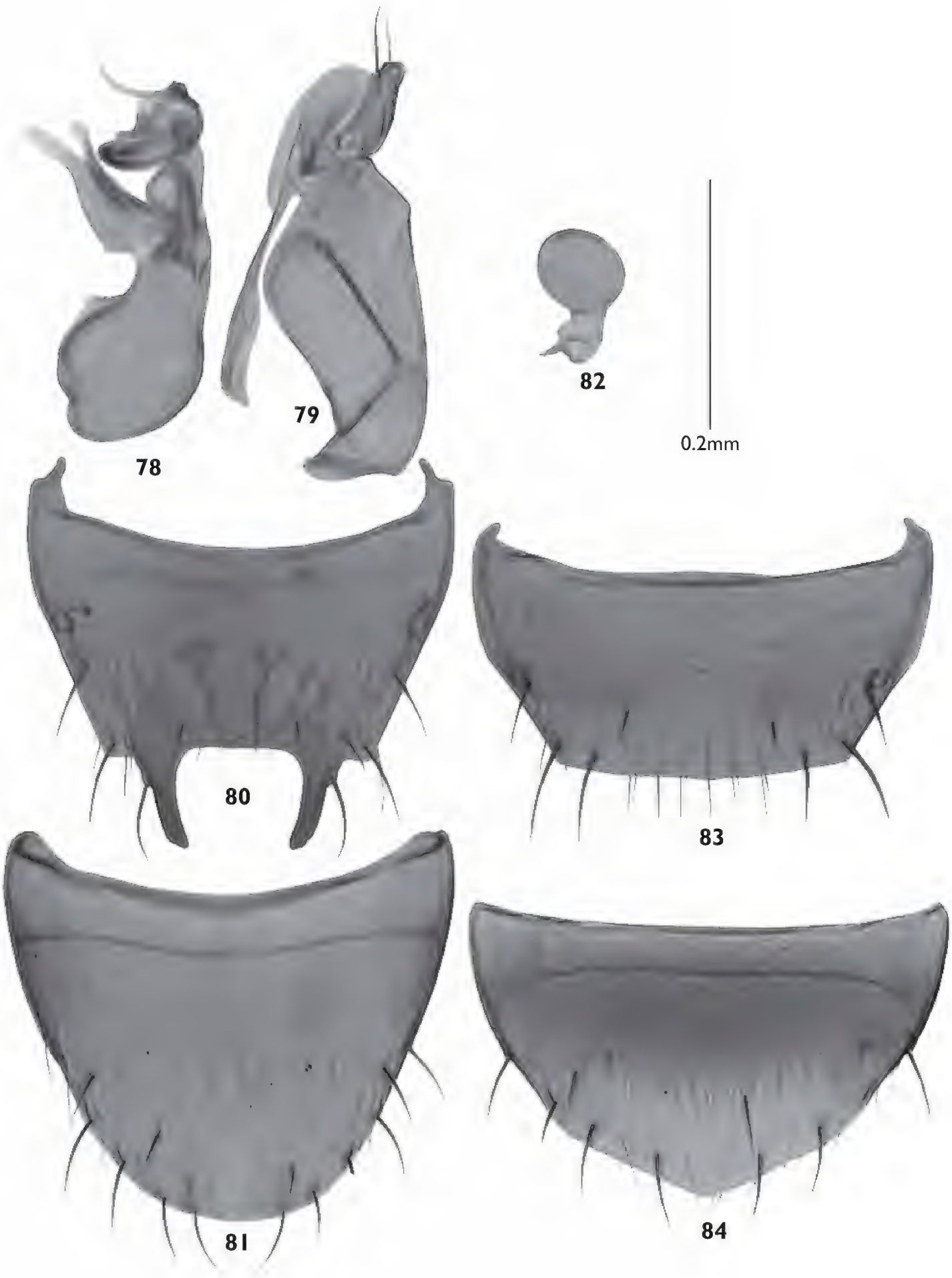
Figures 57–63. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *sculptipennis* Casey: **57** median lobe of aedeagus in lateral view **58** paramere **59** male tergite 8 **60** male sternite 8 **61** spermatheca **62** female tergite 8 **63** female sternite 8.



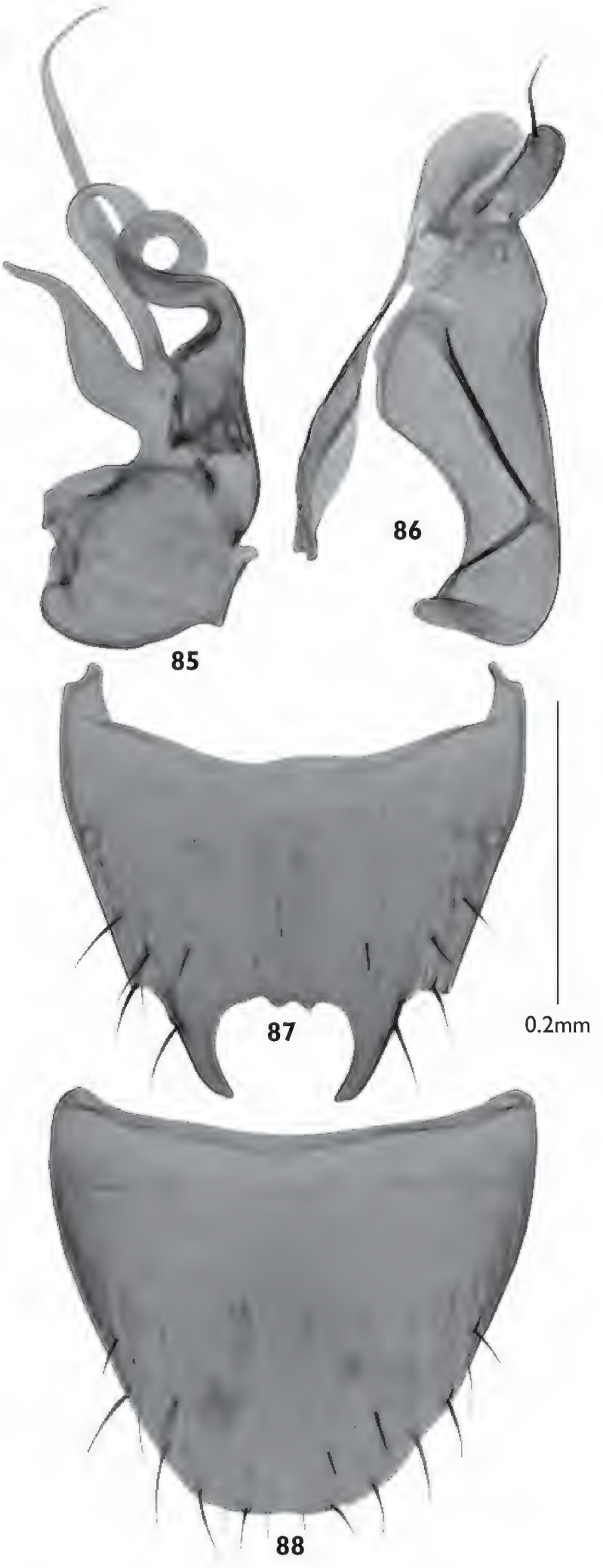
Figures 64–70. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *involuta* Casey: **64** median lobe of aedeagus in lateral view **65** paramere **66** male tergite 8 **67** male sternite 8 **68** spermatheca **69** female tergite 8 **70** female sternite 8.



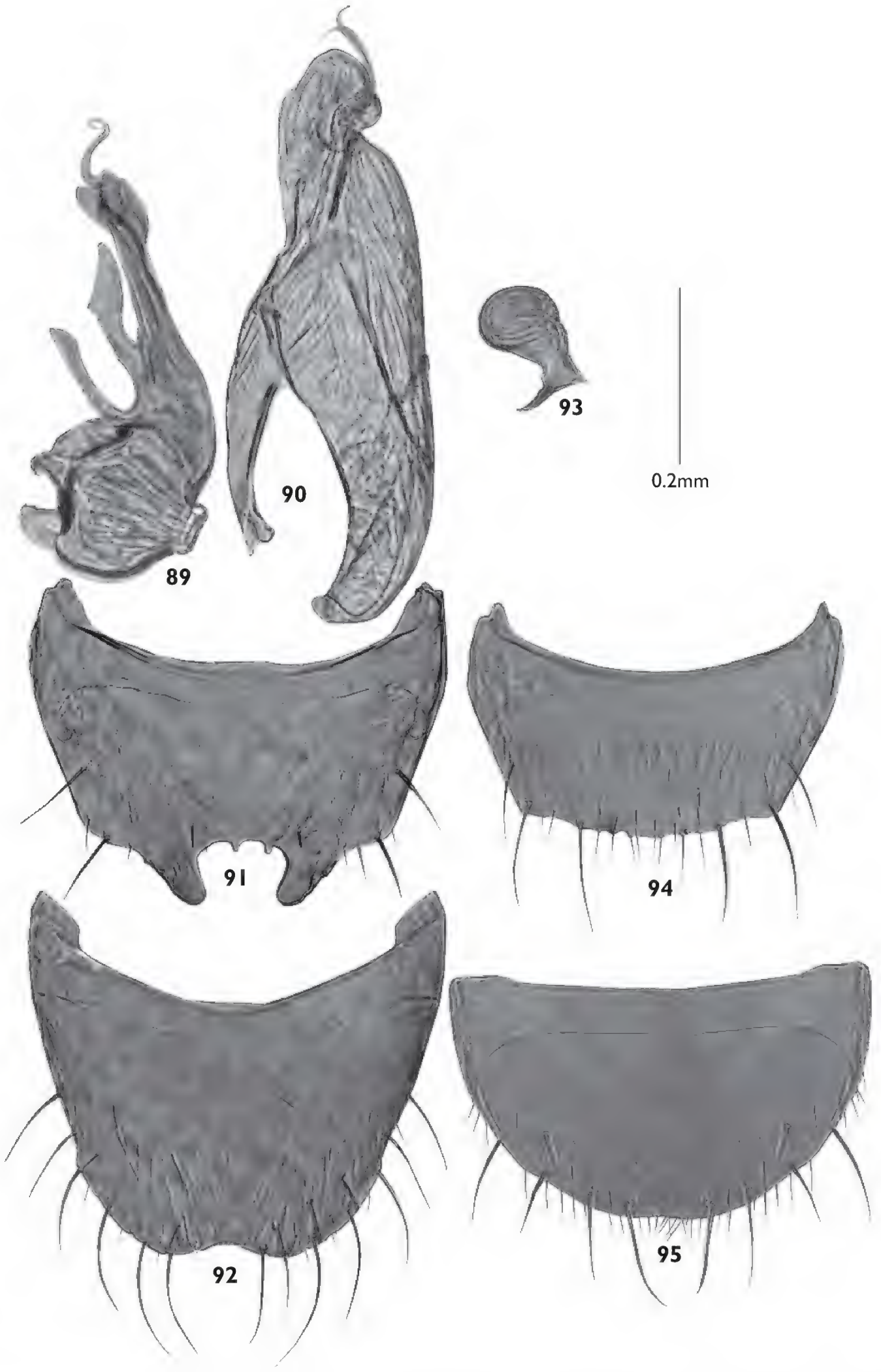
Figures 71–77. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *lobata* Casey: **71** median lobe of aedeagus in lateral view **72** paramere **73** male tergite 8 **74** male sternite 8 **75** spermatheca **76** female tergite 8 **77** female sternite 8.



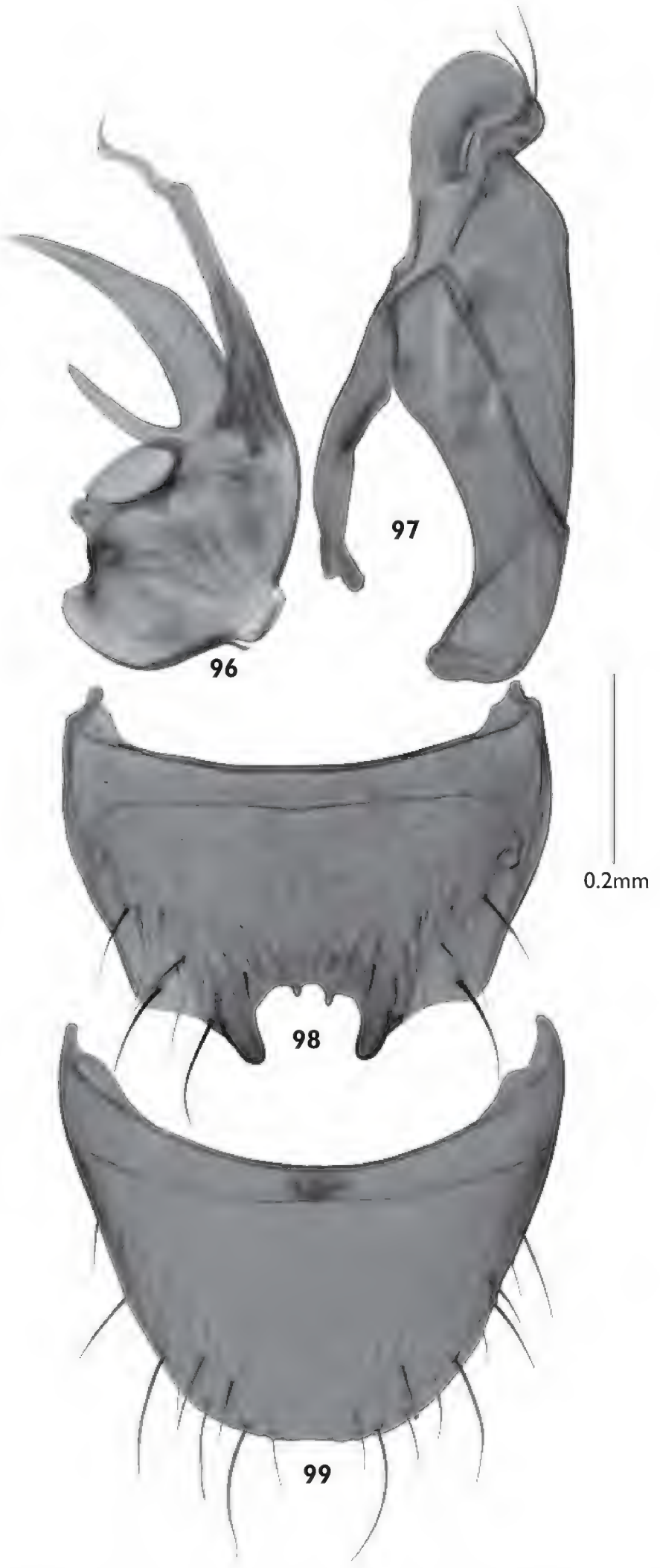
Figures 78–84. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *affinis* Sahlberg: **78** median lobe of aedeagus in lateral view **79** paramere **80** male tergite 8 **81** male sternite 8 **82** spermatheca **83** female tergite 8 **84** female sternite 8.



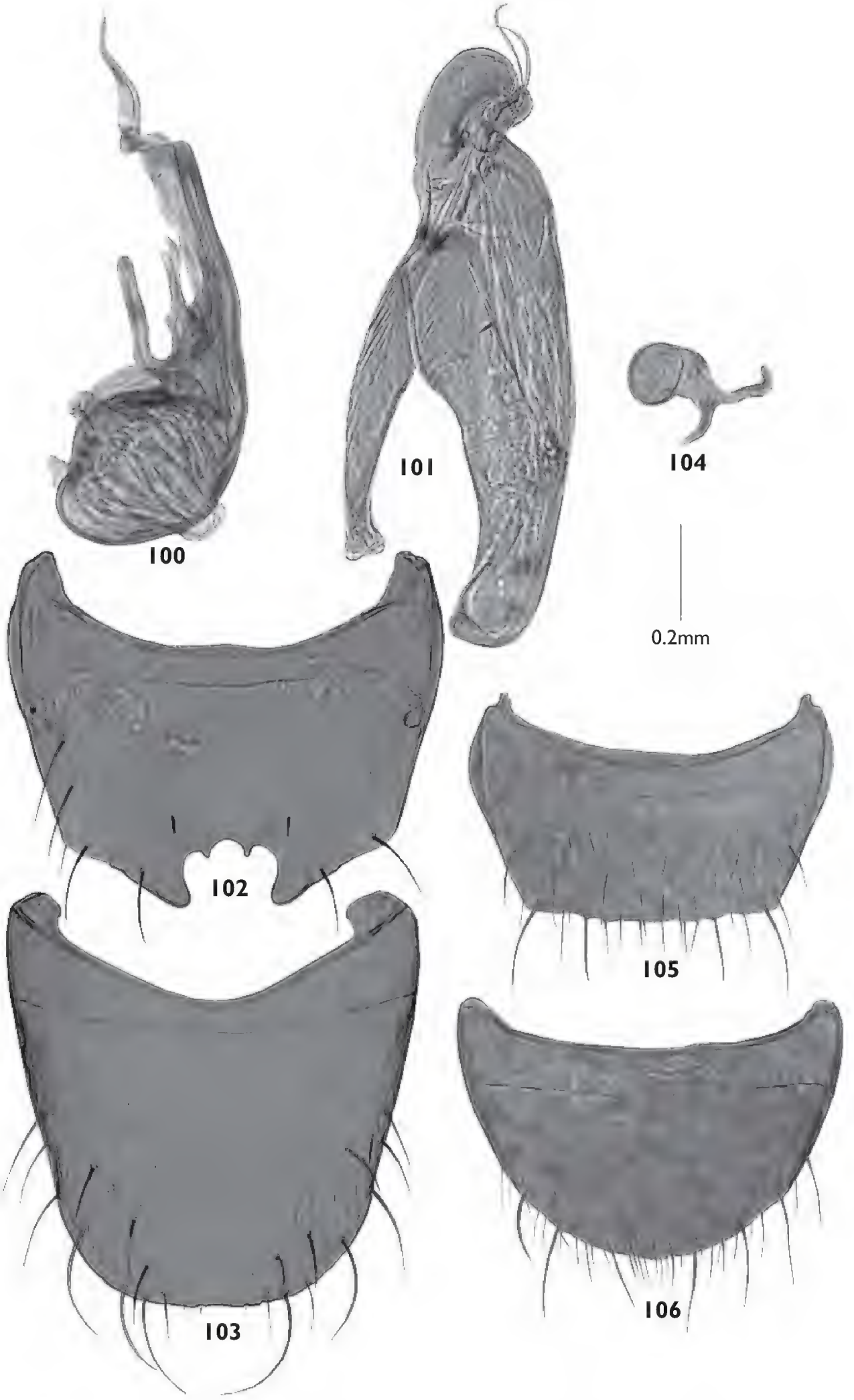
Figures 85–88. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *dybasi* Seevers: **85** median lobe of aedeagus in lateral view **86** paramere **87** male tergite 8 **88** male sternite 8.



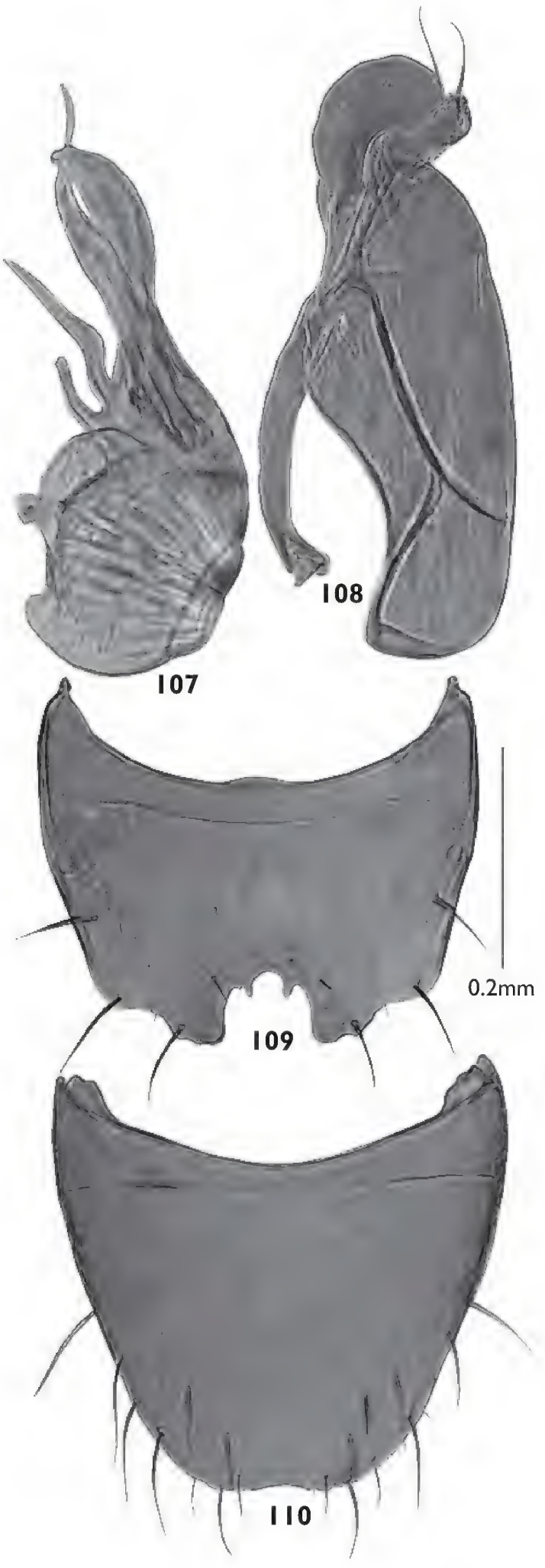
Figures 89–95. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *antennalis* Casey: **89** median lobe of aedeagus in lateral view **90** paramere **91** male tergite 8 **92** male sternite 8 **93** spermatheca **94** female tergite 8 **95** female sternite 8.



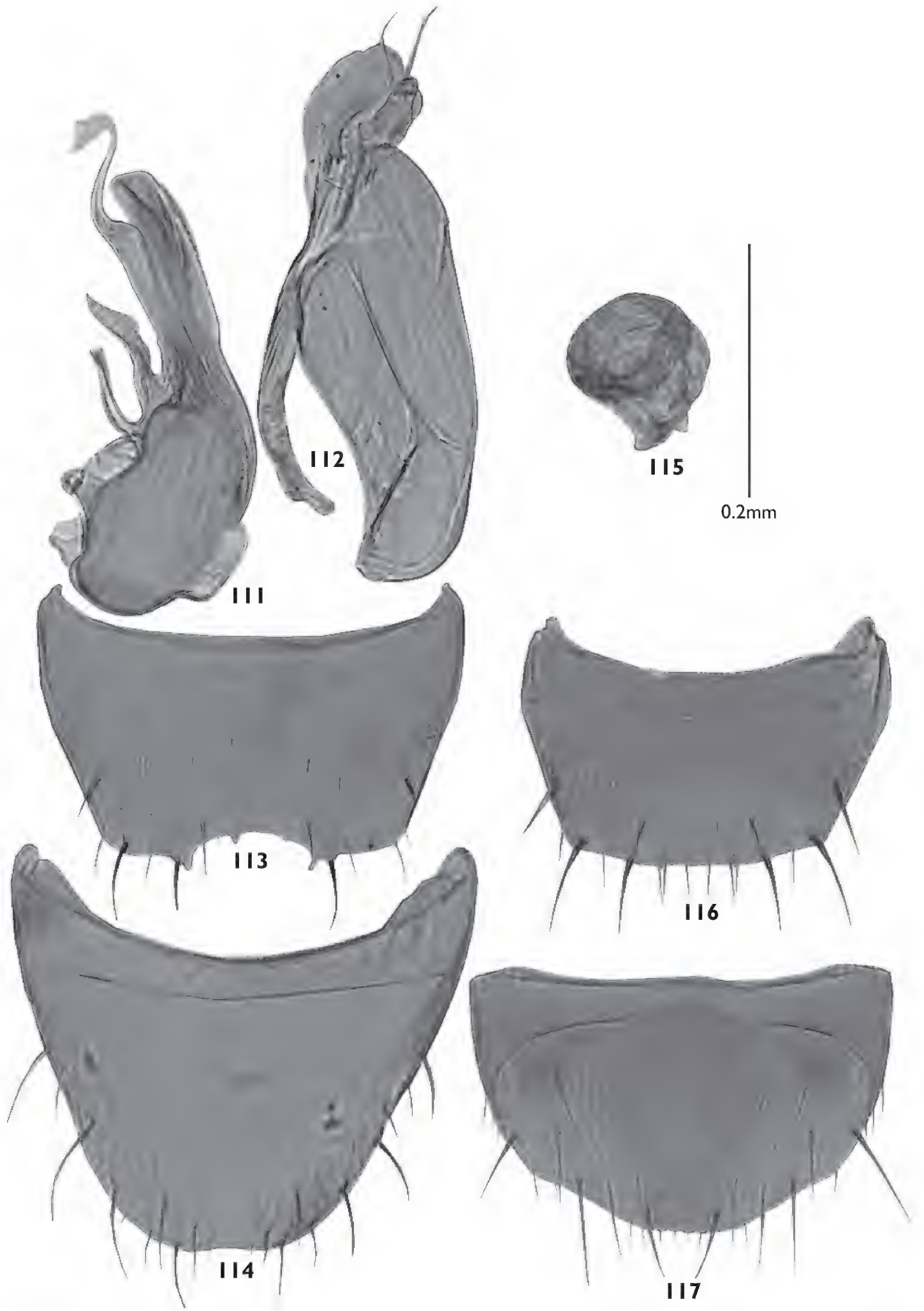
Figures 96–99. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *chippewa* Seevers: **96** median lobe of aedeagus in lateral view **97** paramere **98** male tergite 8 **99** male sternite 8.



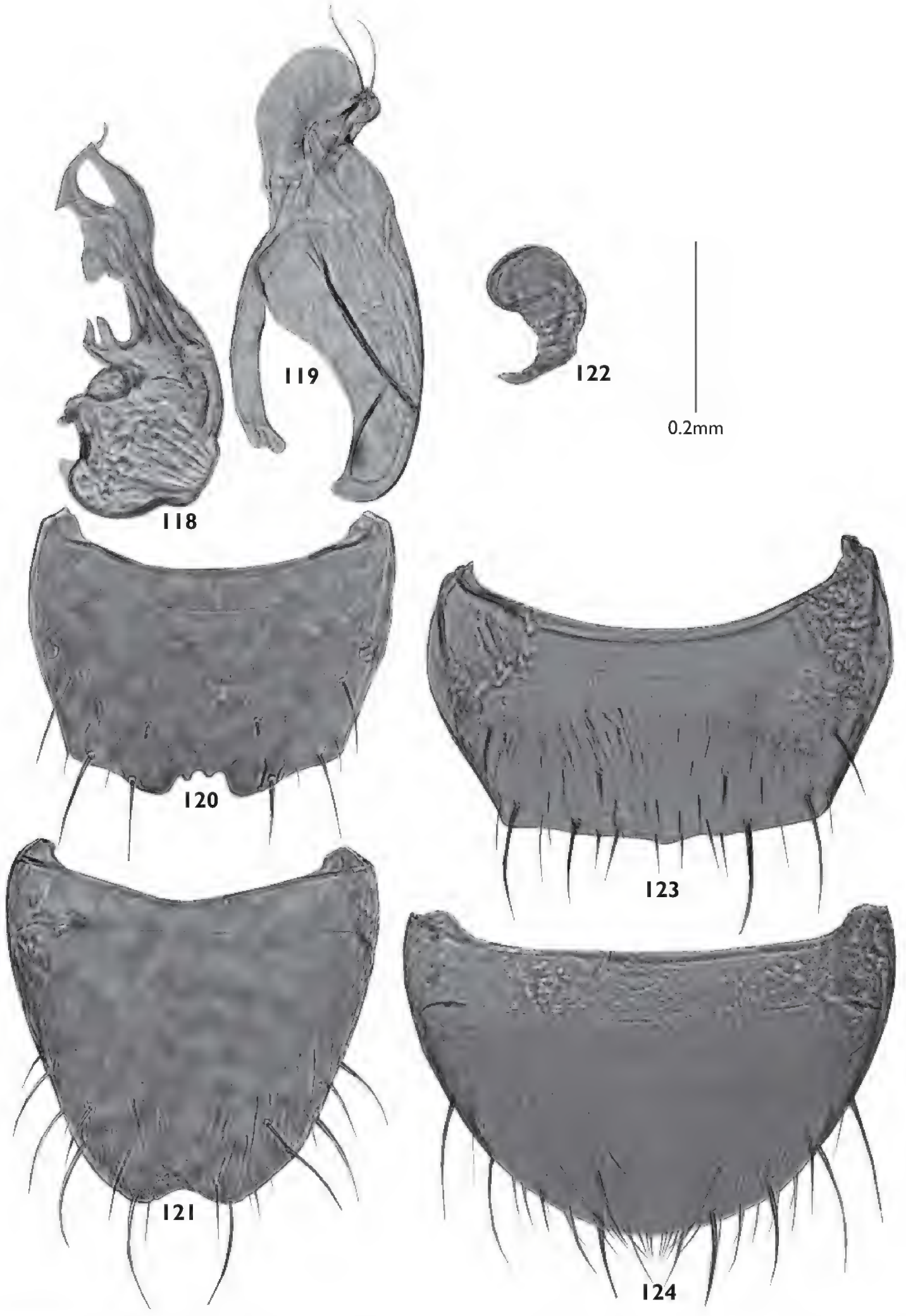
Figures 100–106. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *insolens* Casey: **100** median lobe of aedeagus in lateral view **101** paramere **102** male tergite 8 **103** male sternite 8 **104** spermatheca **105** female tergite 8 **106** female sternite 8.



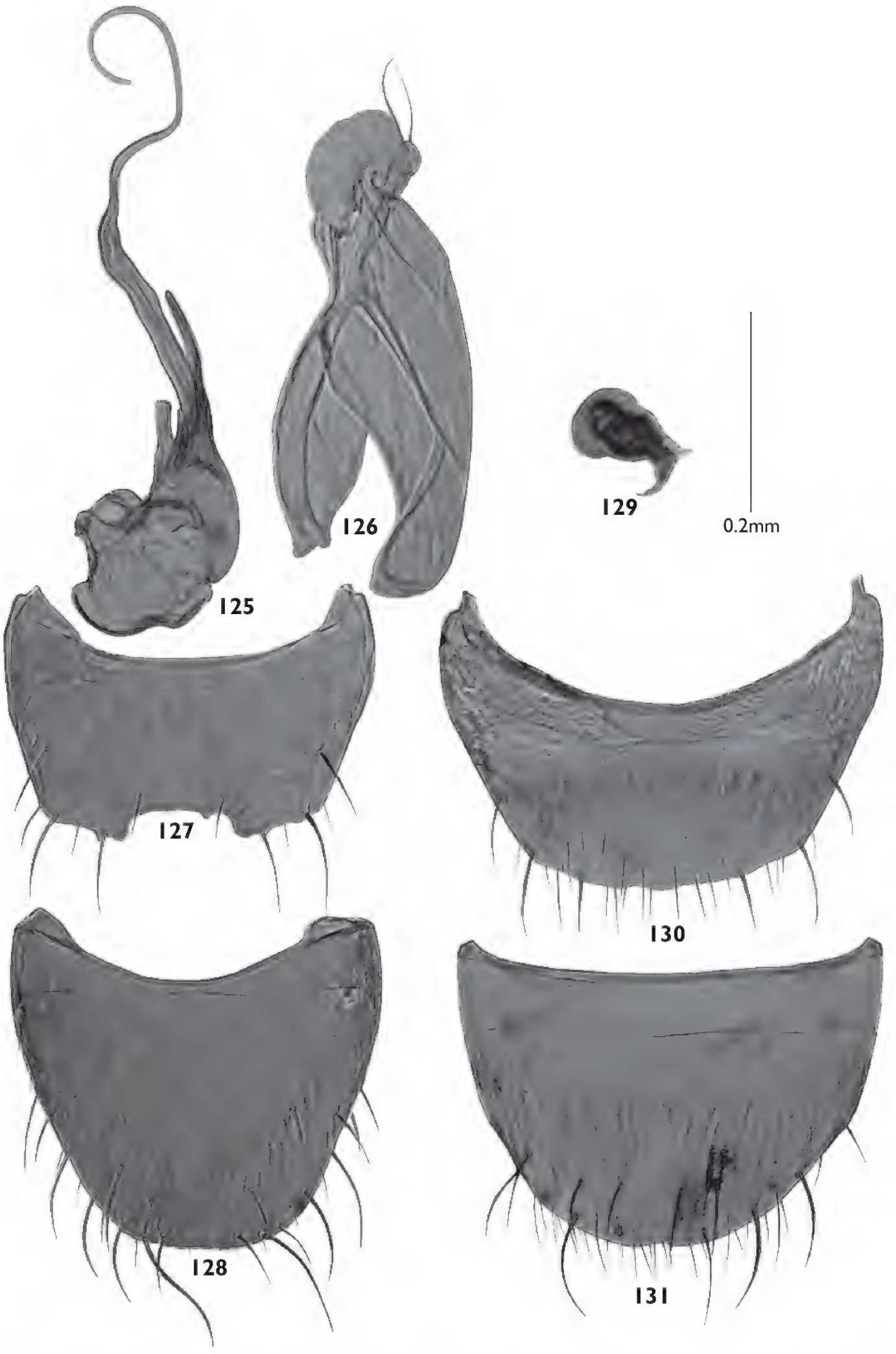
Figures 107–110. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *criddlei* Casey: **107** median lobe of aedeagus in lateral view **108** paramere **109** male tergite 8 **110** male sternite 8.



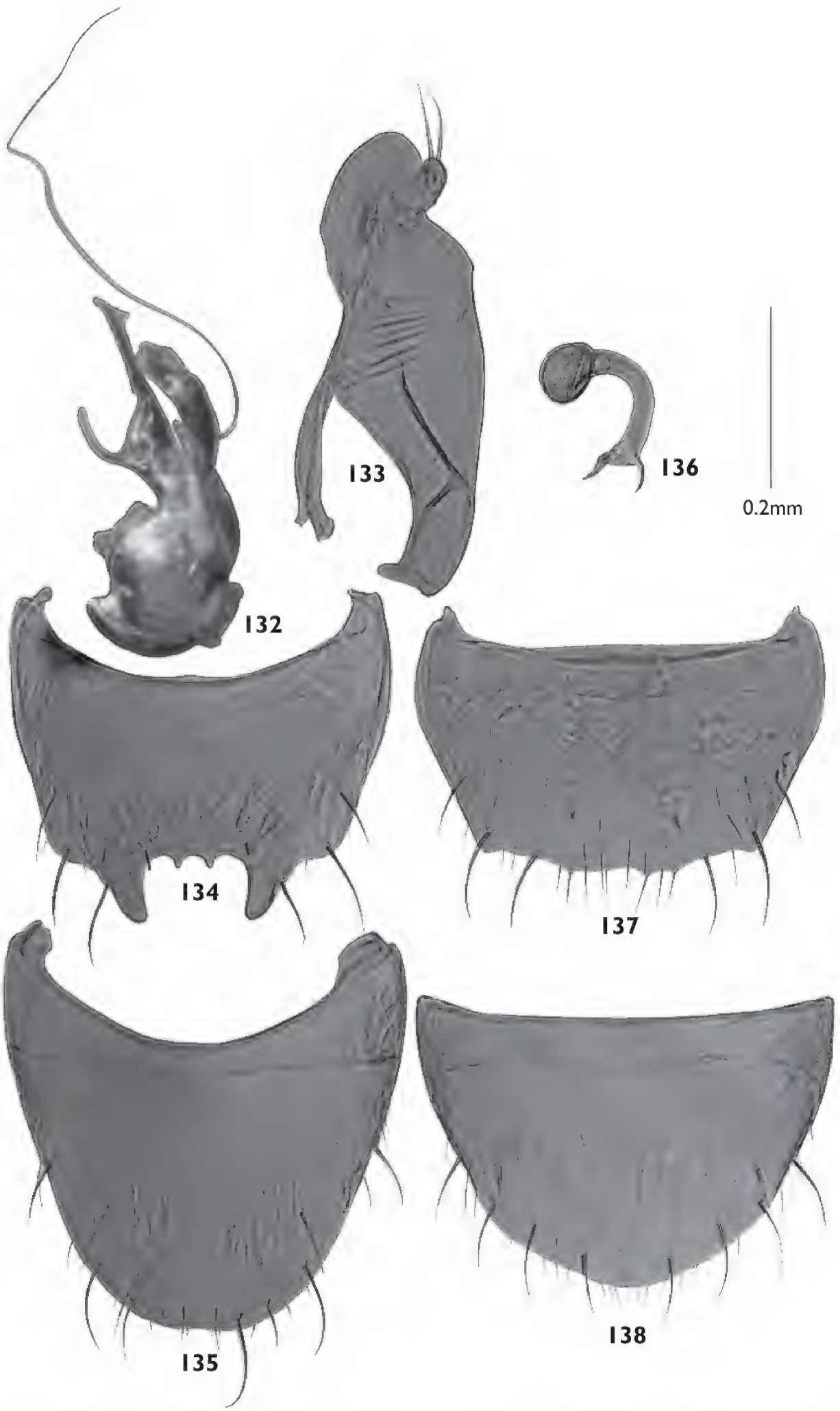
Figures 111–117. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *pseudocriddlei* Klimaszewski and Webster, sp. n.: **111** median lobe of aedeagus in lateral view **112** paramere **113** male tergite 8 **114** male sternite 8 **115** spermatheca **116** female tergite 8 **117** female sternite 8.



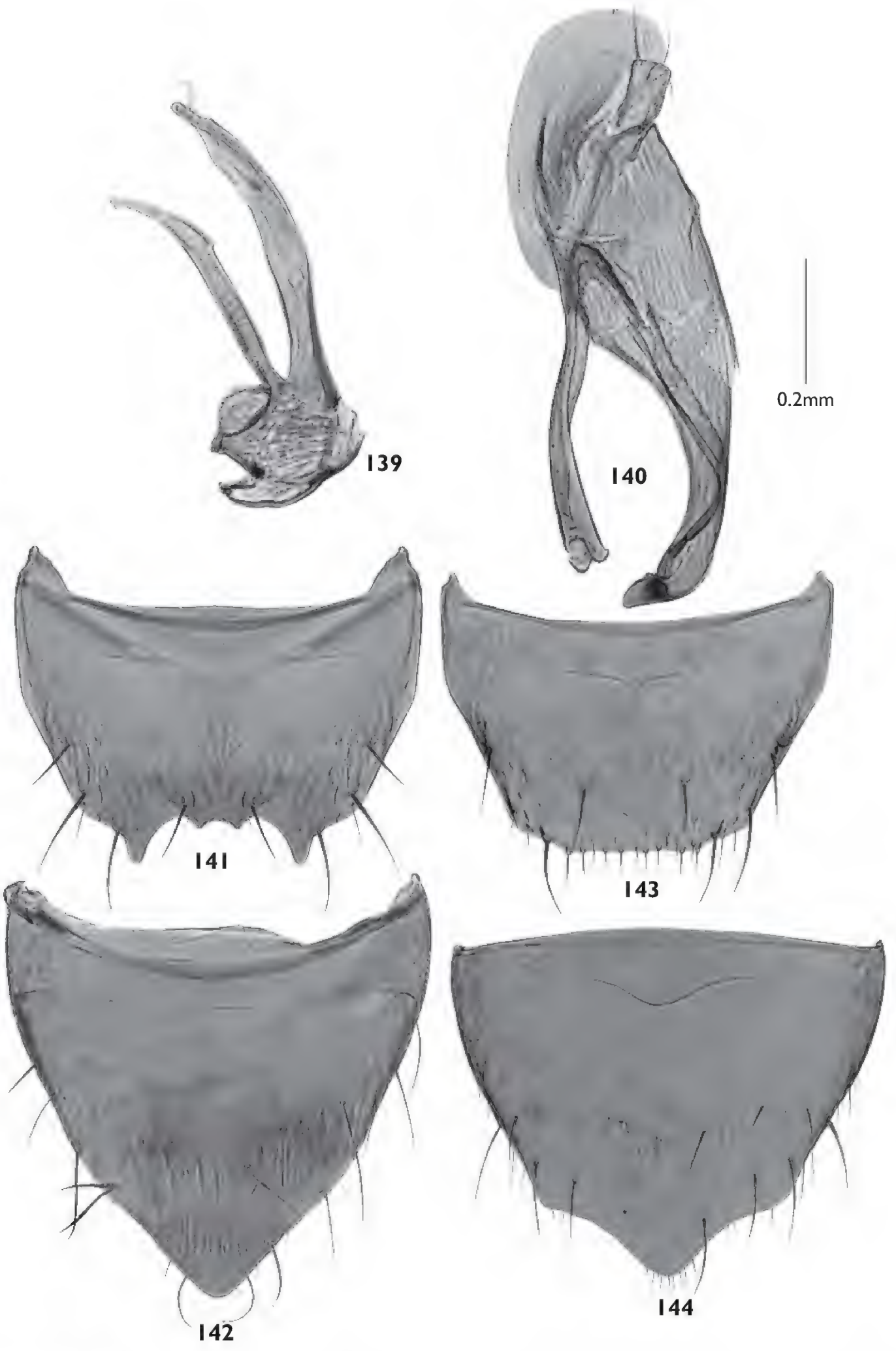
Figures 118–124. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *gilvicollis* Casey: **118** median lobe of aedeagus in lateral view **119** paramere **120** male tergite 8 **121** male sternite 8 **122** spermatheca **123** female tergite 8 **124** female sternite 8.



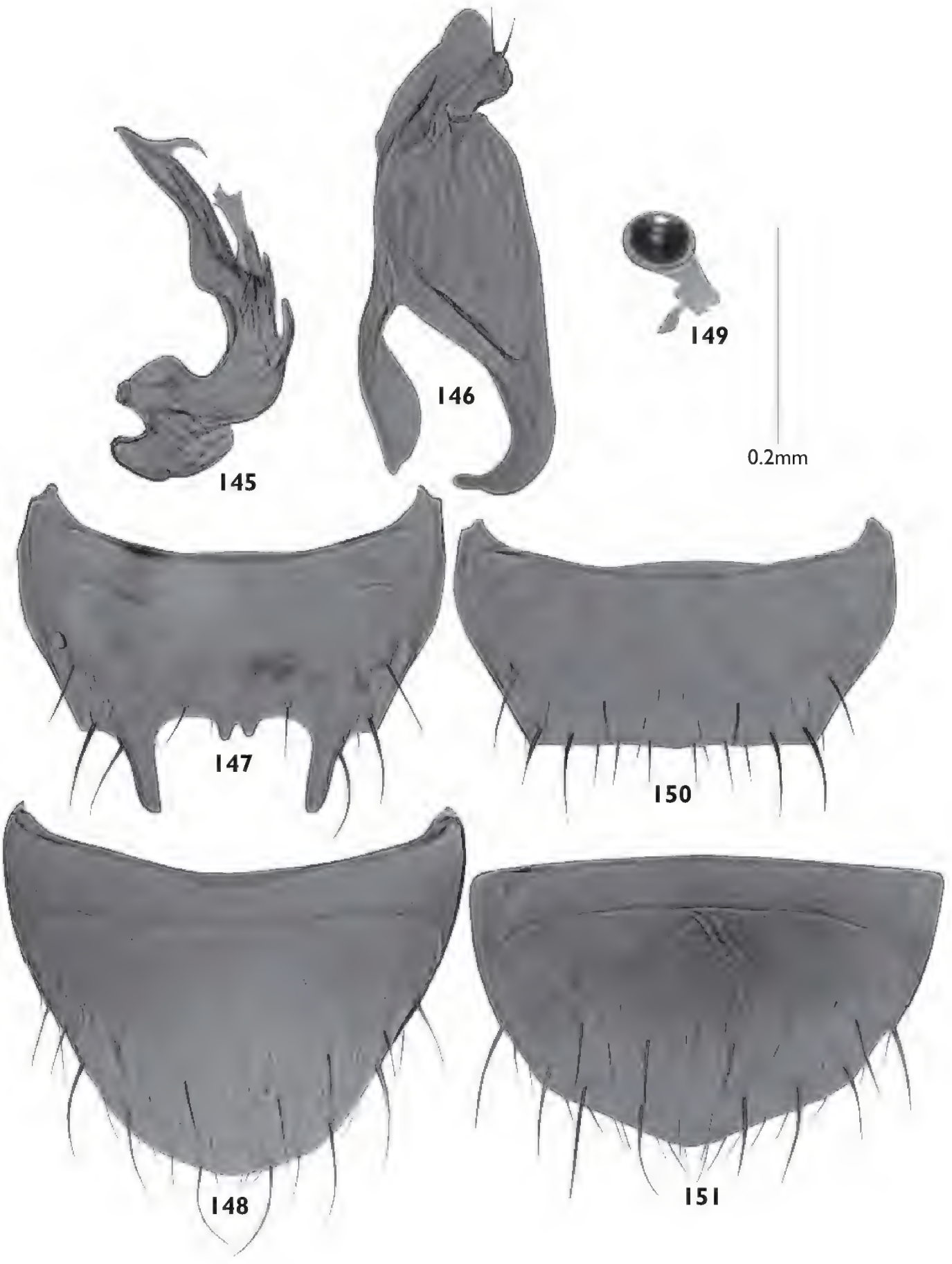
Figures 125–131. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *modesta* Casey: **125** median lobe of aedeagus in lateral view **126** paramere **127** male tergite 8 **128** male sternite 8 **129** spermatheca **130** female tergite 8 **131** female sternite 8.



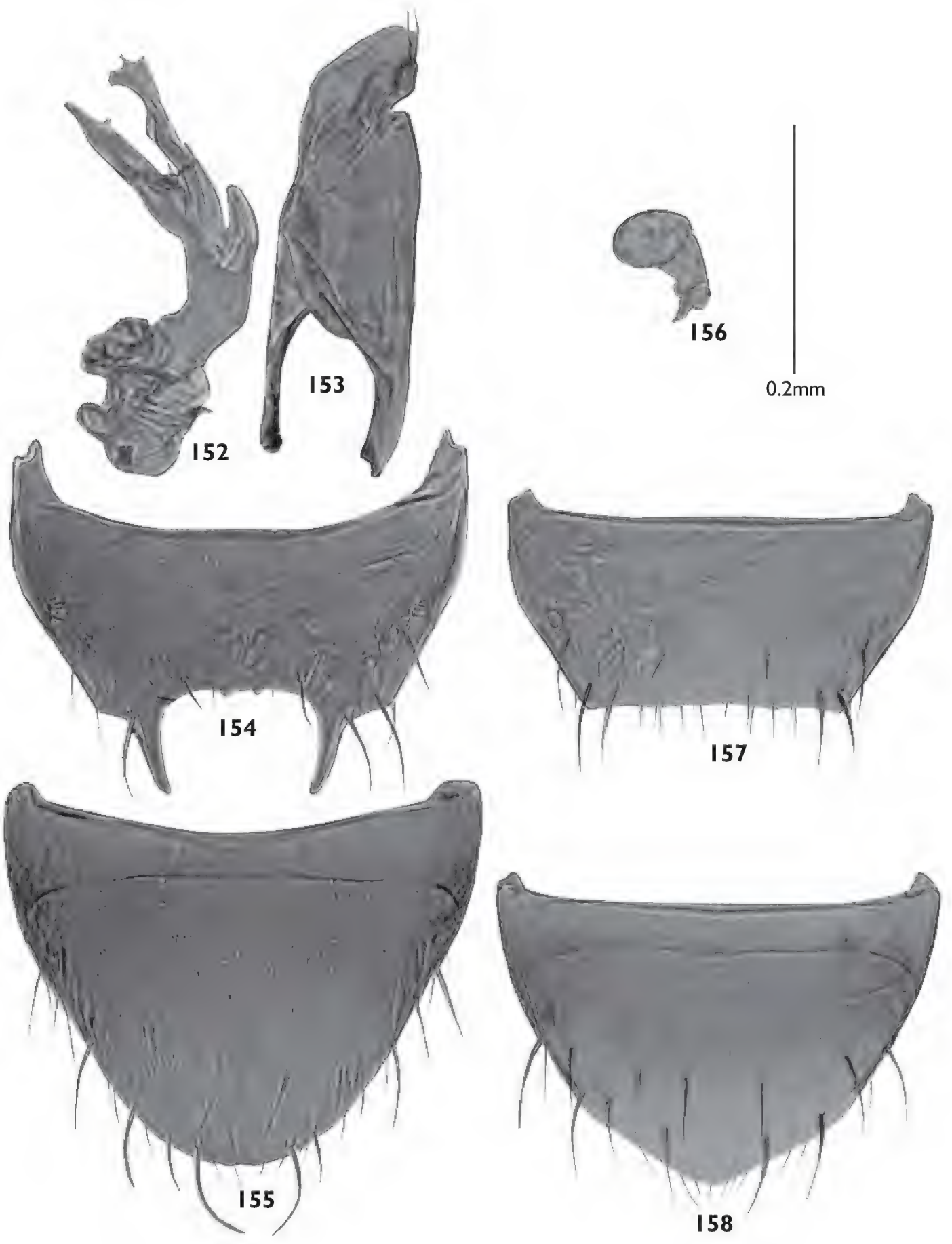
Figures 132–138. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *fuscicollis* Casey: **132** median lobe of aedeagus in lateral view **133** paramere **134** male tergite 8 **135** male sternite 8 **136** spermatheca **137** female tergite 8 **138** female sternite 8.



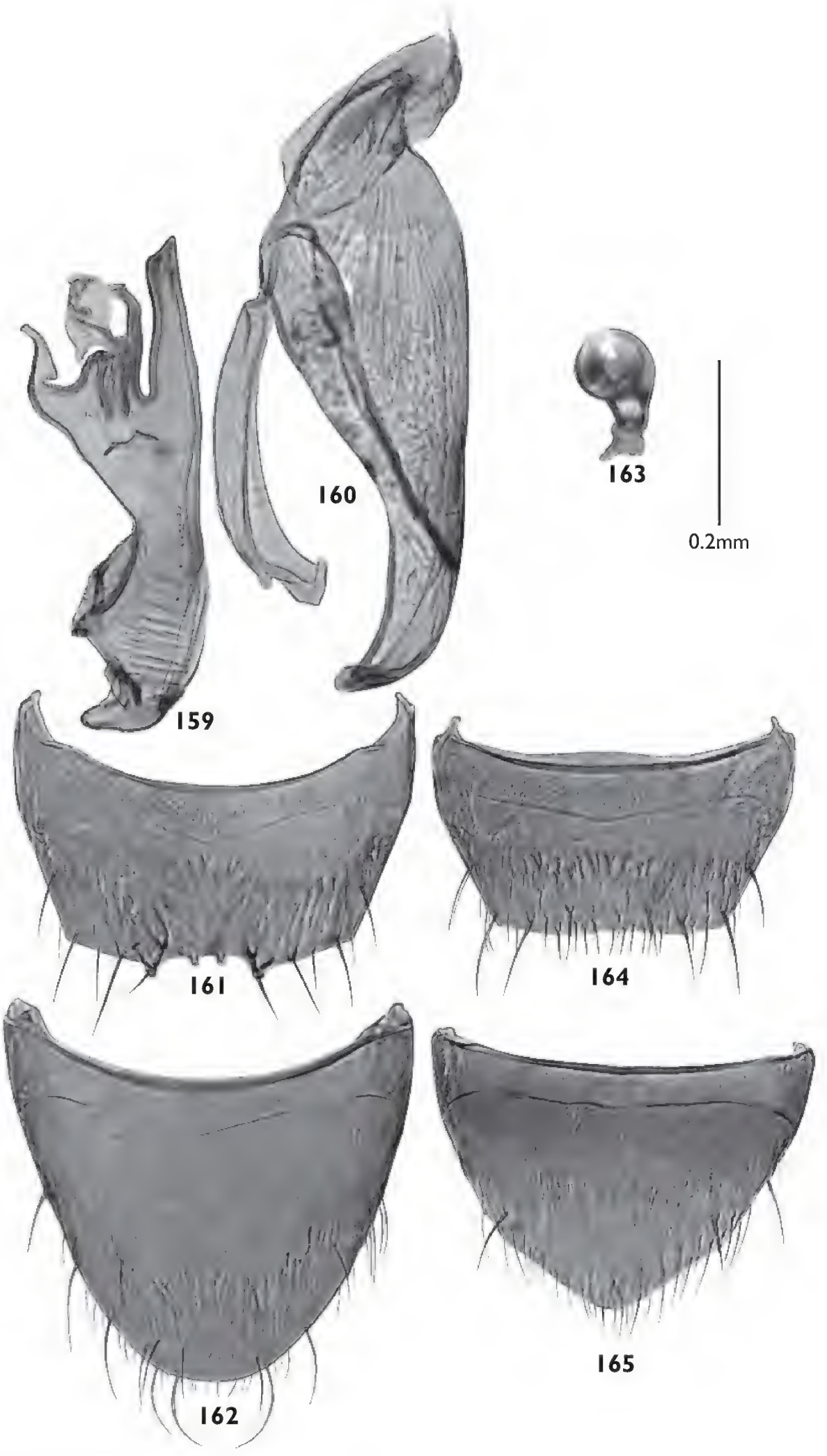
Figures 139–144. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *vitrina* Casey: **139** median lobe of aedeagus in lateral view **140** paramere **141** male tergite 8 **142** male sternite 8 **143** female tergite 8 **144** female sternite 8.



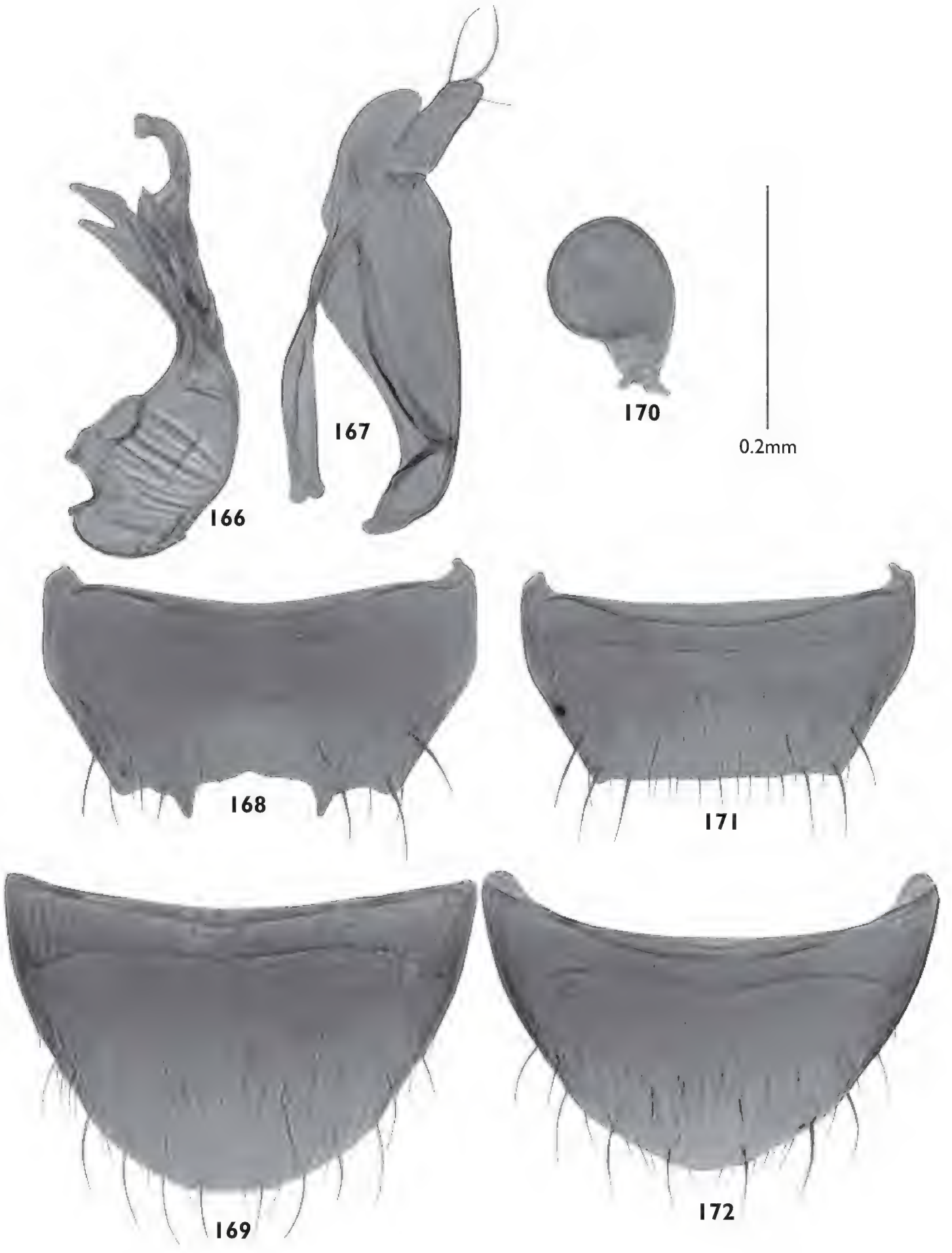
Figures 145–151. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *uteana* Casey: **145** median lobe of aedeagus in lateral view **146** paramere **147** male tergite 8 **148** male sternite 8 **149** spermatheca **150** female tergite 8 **151** female sternite 8.



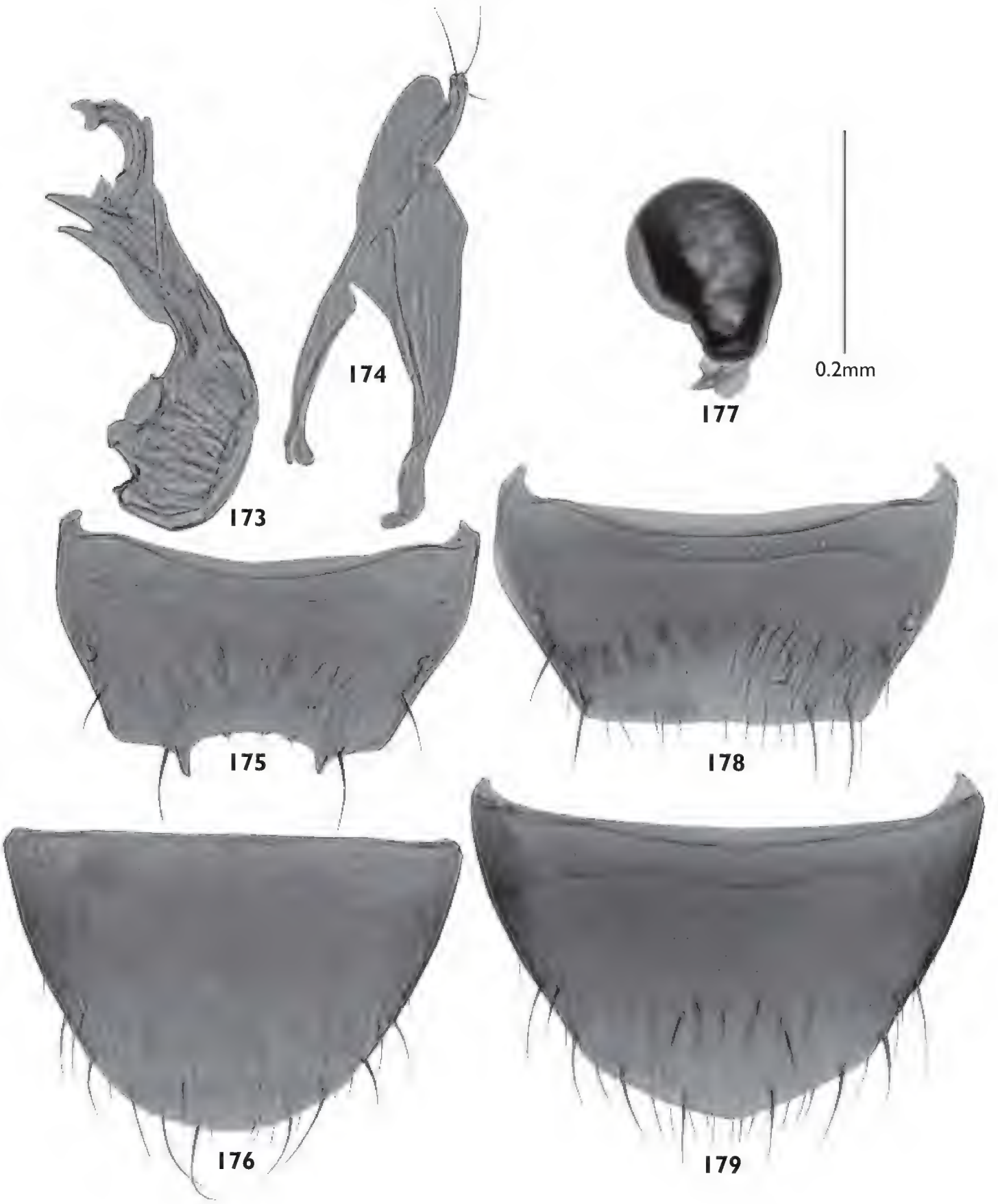
Figures 152–158. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *gaudens* Casey: **152** median lobe of aedeagus in lateral view **153** paramere **154** male tergite 8 **155** male sternite 8 **156** spermatheca **157** female tergite 8 **158** female sternite 8.



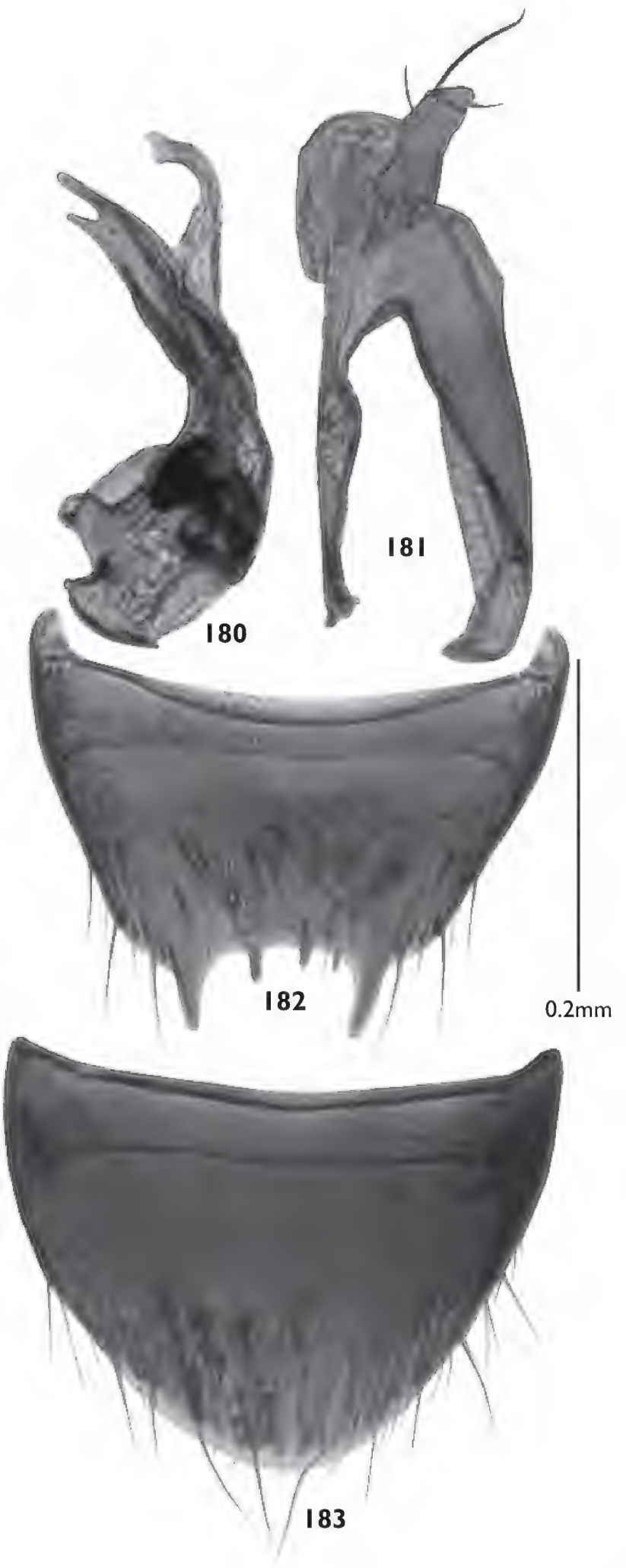
Figures 159–165. Genital and terminal abdominal structures of *Gyrophaena* (*G.*) *flavicornis* Melsheimer: **159** median lobe of aedeagus in lateral view **160** paramere **161** male tergite 8 **162** male sternite 8 **163** spermatheca **164** female tergite 8 **165** female sternite 8.



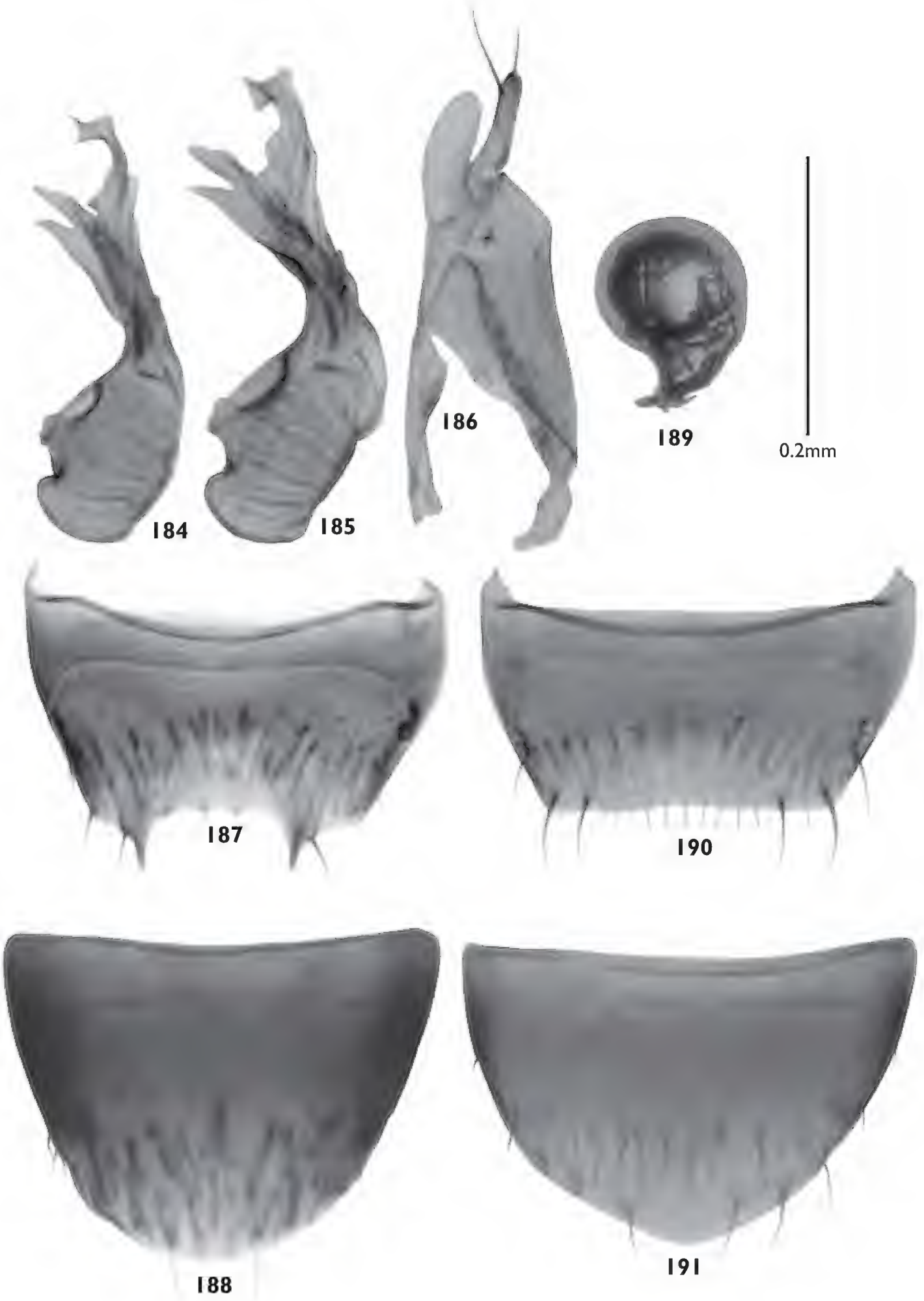
Figures 166–172. Genital and terminal abdominal structures of *Gyrophaena* (*P.*) *subnitens* Casey: **166** median lobe of aedeagus in lateral view **167** paramere **168** male tergite 8 **169** male sternite 8 **170** spermatheca **171** female tergite 8 **172** female sternite 8.



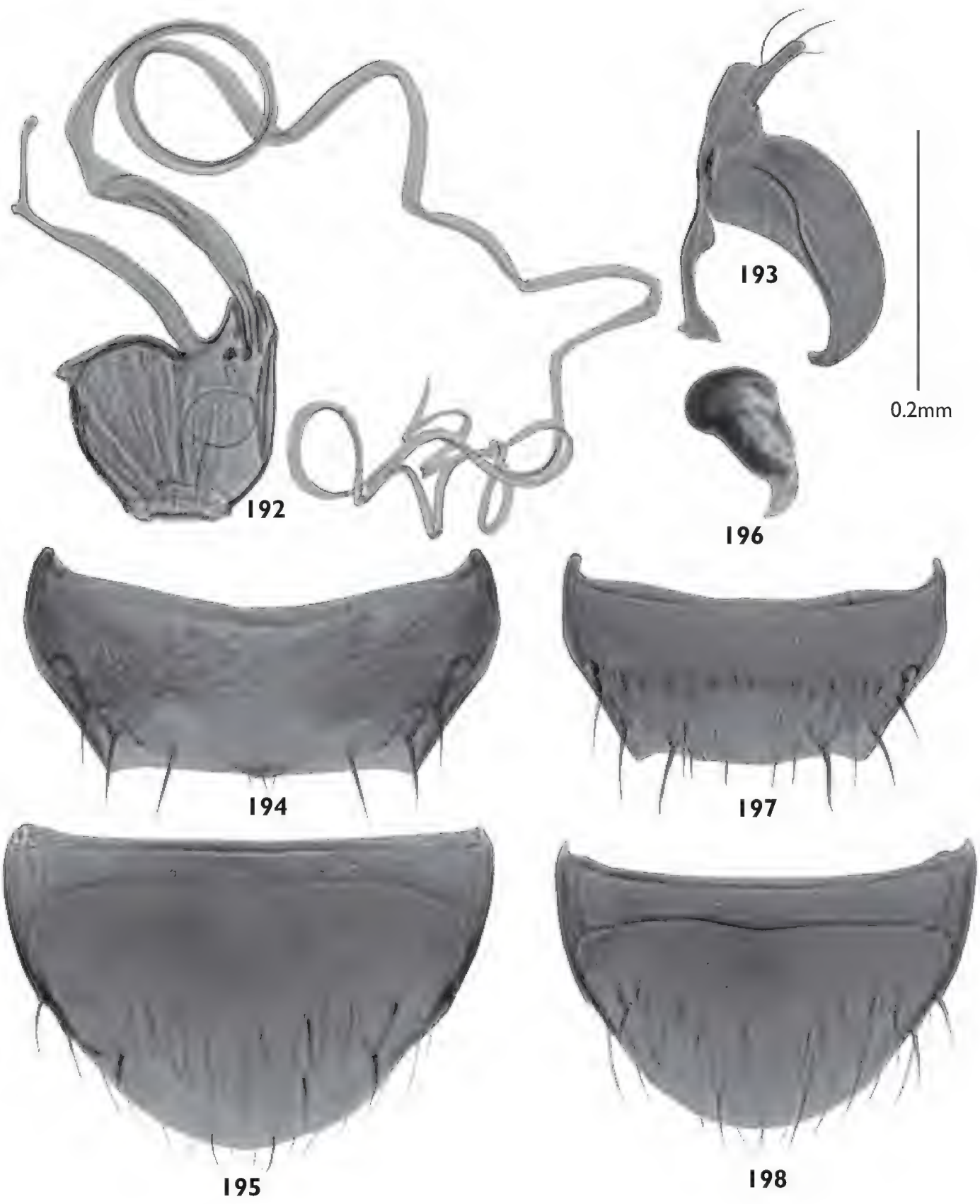
Figures 173–179. Genital and terminal abdominal structures of *Gyrophaena* (*P.*) *meduxnekeagensis* Klimaszewski and Webster, sp. n.: **173** median lobe of aedeagus in lateral view **174** paramere **175** male tergite 8 **176** male sternite 8 **177** spermatheca **178** female tergite 8 **179** female sternite 8.



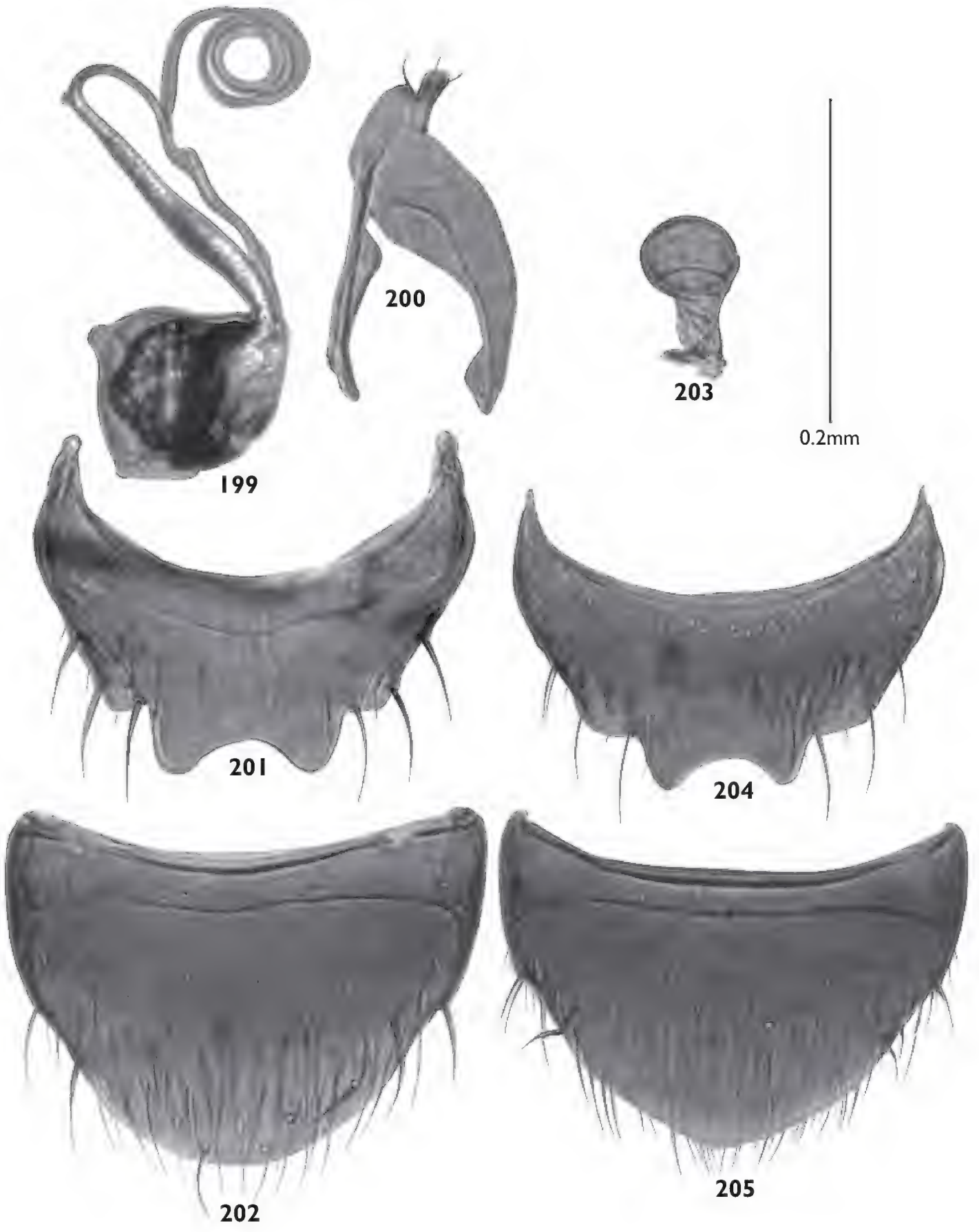
Figures 180–183. Genital and terminal abdominal structures of *Gyrophaena* (*P.*) *polita* (Gravenhorst): **180** median lobe of aedeagus in lateral view **181** paramere **182** male tergite 8 **183** male sternite 8.



Figures 184–191. Genital and terminal abdominal structures of *Gyrophaena* (*P.*) *gracilis* Seevers: **184**, **185** median lobe of aedeagus in lateral view **186** paramere **187** male tergite 8 **188** male sternite 8 **189** spermatheca **190** female tergite 8 **191** female sternite 8.



Figures 192–198. Genital and terminal abdominal structures of *Eumicrota corruscula* (Erichson): **192** median lobe of aedeagus in lateral view **193** paramere **194** male tergite 8 **195** male sternite 8 **196** spermatheca **197** female tergite 8 **198** female sternite 8.



Figures 199–205. Genital and terminal abdominal structures of *Eumicrota socia* (Erichson): **199** median lobe of aedeagus in lateral view **200** paramere **201** male tergite 8 **202** male sternite 8 **203** spermatheca **204** female tergite 8 **205** female sternite 8.

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Appendix 1.

List of specimens examined

Type specimens are listed under each species in the main body of the text and ordinary specimens are listed below. Species are listed in alphabetical order.

Gyrophaena affinis Sahlberg

CANADA. New Brunswick: Carleton Co., near Lakeville (46.3564°N 67.6819°W), mixed forest, on gilled mushroom, 04.VIII.2006, R.P. Webster (1 male, RWC); Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W), mixed forest, on gilled mushroom, 23.VI.2006, R.P. Webster (2 females, 6 males, RWC; Photo 2008-37, 1 female, LFC); same locality data except on small white gilled mushroom on side of decayed log, 19.VII.2006, R.P. Webster (1 male, RWC); **Gloucester Co.**, near Black Rock (47.7411°N 65.2577°W), eastern white cedar swamp, in gilled fungi on rotting log, 08.VI.2006, R.P. Webster (1 male, 1 female, LFC; 1 male, RWC); **Kent Co.**, Kouchibouquac National Park, 20.IX. 1973, A. Smetana & J.M. Campbell (1 sex?, CNC); 11.VII.1973, I.M. Smith (1 sex?, CNC); **Sunbury Co.**, Acadia Research Forest, (45.9816°N 66.3374°W), Road 7 regenerating forest, 8.5-year-old regenerating mixed forest, in gilled mushroom on stump, 18.VI.2007, R.P. Webster (2 males, AFC); same locality except (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (2 males, AFC); same locality and habitat data except 17.VIII.2007, R.P. Webster (1 male, AFC); **York Co.**, Charters Settlement (45.8348°N 66.7335°W), mixed forest, on fleshy fungi, 4.VIII.2004, R.P. Webster (1 male, RWC); NE of Exit 271 off Hwy 2 (45.8776°N 66.8254°W), mixed forest, in mushroom on log, 8.VI.2008, Stephen Clayden (1 male, RWC).

Gyrophaena antennalis Casey

CANADA. New Brunswick: Albert Co., Mary's Point, white spruce forest, *Russulla virescens,* 08.VIII.1998, C.G. Majka (8 sex?, CGMC); **Carleton Co.**, Belleville, Meduxnekeag Valley Nature Preserve (46.1877°N 67.6717°W), hardwood forest, in *Climacodon septentrionale,* on dead standing sugar maple, 02.IX.2008, R.P. Webster, GYR-RW-56 (1 male, RWC; GYR-RW-49 1 male, RWC); same locality except (46.1878°N 67.6705°W), hardwood forest, on *Pleurotus* sp. on log, 18.VIII. 2008, R.P. Webster (GYR-RW-50, female, LFC; GYR-RW-51, 1 female, RWC; GYR-RW-52, 1 female, LFC); same locality except (46.1910°N 67.6740°W), mixed forest, on gilled mushroom, 13.IX.2006, R.P. Webster (1 female, RWC); same locality data except on gilled mushroom, 31.VIII.2006, R.P. Webster (2 males, LFC; 7 males, 2 females, RWC); same locality except (46.1980°N 67.6854°W), mixed forest, on gilled

mushroom, 31.VIII.2006, R.P. Webster (Photo 2008-110, 1 male, LFC); same locality except (46.1907°N 67.6740°W), mixed forest, on fleshy (gilled) fungi, 07.IX.2004, R.P. Webster (1 male, 1 sex?, LFC; 2 males, 1 sex?, RWC; Photo 2008-111, 1 female, LFC); same locality data except mixed forest, on gilled fungi, 14.IX. 2005, R.P. Webster (1 female, RWC); same locality except (46.1957°N 67.6803°W), mixed forest, in gilled fungi, 15.IX.2004, R.P. Webster (1 sex?, RWC); near Belleville 1.3 km E. jct. Rt. 540 & Plymouth Rd. (46.1860°N 67.6847°W), mixed forest with hemlock, on *Pleurotus* sp. on log, 20.IX.2008, R.P. Webster (GYR-RW-70, 1 male, LFC); Jackson Falls "Bell Forest Preserve" (46.2200°N 67.7230°W), hardwood forest, on gilled mushroom on log, 12.IX.2008, R.P. Webster (GYR-RW-30, 1 female, RWC); **Charlotte Co.**, near New River (45.2122°N 66.6160°W), eastern white cedar swamp, in gilled fungi, 22.IX.2006, R.P. Webster (1 male, LFC); near New River (45.2135°N 66.6434°W), eastern white cedar swamp, on gilled mushroom, 22.IX.2006, R.P. Webster (1 sex?, LFC); **Kent Co.**, Kouchibouquac National Park, 16.IX.1973, J.M. Campbell (1 sex?, CNC); **Saint John Co.**, Chance Harbour (45.1391°N 66.3696°W), yellow birch and spruce forest, on gilled mushrooms on forest floor, 16.IX.2008, R.P. Webster (GYR-RW-73, 1 male, LFC); **Sunbury Co.**, Lakeville Corner (45.9007°N 66.2423°W), silver maple forest on ridge with oak, on gilled mushroom, 10.IX.2006, R.P. Webster (1 male, RWC); Acadia Research Forest, (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.IX.2007, R.P. Webster (1 male, AFC); **York Co.**, Charters Settlement (45.8286°N 66.7365°W), mature mixed forest, on small gilled mushroom on log, 26.IX.2008, R.P. Webster (GYR-RW-38, 1 male, RWC; GYR-RW-39, 1 male, RWC; GYR-RW-40, 1 male, RWC; GYR-RW-41, 1 sex?, RWC; GYR-RW-42, 1 male, RWC).

Gyrophaena caseyi Seevers

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1897°N 67.6710°W), mixed forest, on gilled mushroom, 12.IX.2008, R.P. Webster (GYR-RW-8, 1 male, LFC); same locality except (46.1907°N 67.6740°W), mixed forest, on fleshy (gilled) fungi, 07.IX.2004, R.P. Webster (1 female, RWC); same locality except (46.1910°N 67.6740°W), mixed forest, on *Pleurotus* sp. on side of log, 13.VIII.2006, R.P. Webster (1 male, RWC); same locality except (46.1980°N 67.6854°W), mixed forest, on gilled mushroom, 31.VIII.2006, R.P. Webster (1 male, 1 female, RWC); near Belleville 1.3 km E. jct. Rt. 540 & Plymouth Rd. (46.1860°N 67.6847°W), mixed forest with hemlock, on small gilled mushroom on rotten log, 20.IX.2008, R.P. Webster (GYR-RW-22, 1 male, LFC; GYR-RW-23, 1 male, RWC; GYR-RW-24, RWC, 1 male; GYR-RW-25, 1 male, LFC); same locality, on *Pleurotus* sp. on log, 20.IX.2008, R.P. Webster (GYR-RW-61, 1 male, RWC); Jackson Falls "Bell Forest Preserve" (46.2200°N 66.7230°W), hardwood forest, on gilled mushroom on log, 12.IX.2008, R.P. Webster (GYR-RW-36, 1 male, RWC; GYR-RW-37, 1 female, RWC; GYR-RW-35, 1 female, RWC; GYR-

RW-27, 1 sex?, RWC); **Saint John Co.**, Chance Harbour (45.1391°N 66.3696°W), yellow birch and spruce forest, on gilled mushrooms on forest floor, 16.IX.2008, R.P. Webster (GYR-RW-71, 1 male, LFC; GYR-RW-77, 1 male, RWC; GYR-RW-74, 1 male, LFC); same locality data except in red spruce and birch forest, on gilled mushroom, 24.VIII.2006, R.P. Webster (1 male, 1 female, LFC; 6 males, RWC; Photo 2008-84, 1 male, LFC; Photo 2008-85, 1 female, LFC); Dipper Harbour (45.1176°N 66.3806°W), red spruce forest, on gilled mushroom, 12.IX.2006, R.P. Webster (1 male, LFC; 2 males, RWC); **Sunbury Co.**, Acadia Research Forest (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.IX.2007, R.P. Webster (1 male, AFC).

Gyrophaena chippewa Seevers

CANADA. New Brunswick: Carleton Co., Belleville Meduxnekeag Valley Nature Preserve (46.1910°N 67.6740°W), mixed forest, on gilled mushroom, 31.VIII.2006, R.P. Webster, Photo 2008-38 (1 male, LFC; 1 male, RWC).

Eumicrota corruscula (Erichson)

CANADA. New Brunswick: Carleton Co., Hovey Hill Protected Natural Area (46.1115°N 67.7770°W), hardwood forest, on *Pleurotus* sp. on log, 19.VIII.2004, R.P. Webster (3 sex?, 1 female); Jackson Falls, "Bell Forest" (46.2200°N 67.7230°W), hardwood forest, on fleshy polypore mushroom on log, 12.IX.2008, R.P. Webster, GYR-RW-44, Photo 2009-30 (1 male, LFC); same locality data except in hardwood forest, on gilled mushroom on log, 12.IX.2008, R.P. Webster, GYR-RW-33 (1 male, RWC); same locality data except in hardwood forest, on fleshy polypore fungus on beech log, 16.IX.2006 (1 male, RWC); Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W), mixed forest, on *Pleurotus* sp. on log, 8.VIII.2006 (2 males, RWC); same locality except (46.1877°N 67.6717°W), hardwood forest, on *Polyporus arcularius* on trunk of dead hardwood, 9.VI.2008 (1 female, RWC); same locality data except in slightly decayed polypore fungus on log, 8.VIII.2006 (1 female, LFC); same locality data except on *Pleurotus* sp. on log, 18.VIII.2008, R.P. Webster (GYR-RW-45, Photo 2009-31, 1 female, LFC).

Gyrophaena criddlei Casey

CANADA. New Brunswick: Carleton Co., Hartland, Becaguimec Island (46.3106°N 67.5392°W), hardwood forest, on *Pleurotus* sp. on log, 16.IX.2006, R. Capozi & R.P. Webster (1 male, LFC; 8 males, RWC; Photo 2008-108, 1 male, LFC); Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W), mixed forest, on

fleshy gilled fungi, 07.IX.2004, R.P. Webster (1 male, RWC); same locality data except on gilled fungi, 14.IX.2005, R.P. Webster (1 male, LFC; 2 males, RWC).

Gyrophaena dybasi Seevers

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1940°N 67.6800°W), mixed forest, on gilled mushroom, 23.VI.2006, R.P. Webster, Photo 2008-39 (1 male, LFC; 1 male, RWC).

Gyrophaena flavicornis Melsheimer

CANADA. New Brunswick: Carleton Co., Hartland, Becaguimec Island (46.3106°N 67.5392°W), hardwood forest, on *Pleurotus* sp. on log, 16.IX.2006, R. Capozi & R.P. Webster (Photo 2008-82, 1 male, LFC); Jackson Falls, "Bell Forest Preserve" (46.2200°N 67.7230°W), hardwood forest, in *Porodaedalea piceina* on dead standing beech tree, 20.IX.2008, R.P. Webster (GYR-RW-1, 1 male, RWC; GYR-RW-2, 1 sex?, RWC); same locality except (46.2208°N 67.7211°W), rich Appalachian hardwood forest, in gilled fungi, 12.VII.2004, K. Bredin, J. Edsall & R.P. Webster (1 female, RWC); Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W), mixed forest, on fleshy (gilled) fungi, 07.IX.2004, R.P. Webster (1 sex?, LFC; 4 males, 2 females, 1 sex?, RWC); same locality data except in hardwood forest, on gilled mushroom, 14.IX.2005, R.P. Webster (1 male, RWC); same locality data except in hardwood forest, on small gilled fungi on side of log, 08.VIII.2006, R.P. Webster (1 male, LFC); same locality data except in mixed forest, on gilled mushroom, 23.VI.2006, R.P. Webster (1 male, LFC; 2 males, 1 sex?, RWC); same locality except (46.1919°N 67.6724°W), mixed forest, in fleshy (gilled) fungi, 21.VIII.2004, R.P. Webster (1 female, LFC); same locality data except 27.VIII.2004, D. Sabine & R.P. Webster (1 male, RWC); same locality except (46.1883°N 67.6745°W), hardwood forest, in gilled fungi, 09.VIII.2005, M. Giguère & R.P. Webster (1 male, RWC); same locality except (46.1957°N 67.6803°W), mixed forest, in gilled fungi, 01.VIII.2004, R.P. Webster (2 females, RWC), Photo 2008-83 (1 female, LFC); same locality data except on bracket fungi, 01.VIII.2004, R.P. Webster (2 females, RWC); **Sunbury Co.**, Maugerville, Portobello Creek N.W.A. (45.9031°N 66.4268°W), oak and red maple forest, on gilled mushroom, 11.IX.2006, R.P. Webster (1 male, LFC); Acadia Research Forest, (46.0188°N 66.3765°W), Road 16 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (1 male, 1 sex?, AFC); same locality except (45.9816°N 66.3374°W), Road 7 regenerating forest, 8.5-year-old regenerating mixed forest, in gilled mushroom on stump, 18.VI.2007, R.P. Webster (3 males, 2 sex? AFC); same locality except (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (1 male, AFC); same locality and habitat data except 17.VIII.2007, R.P. Webster (1 male, AFC);

same locality and habitat data except 18.IX.2007 (1 male, AFC); **York Co.**, Charters Settlement (45.8348°N 66.7335°W), mixed forest, in fleshy fungi, 4.VIII.2004, R.P. Webster (2 males, RWC).

Gyrophaena fuscicollis Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W), mixed forest, on small gilled mushroom on log, 19.VII.2006, R.P. Webster (6 males, 1 female, RWC); same locality data except in mixed forest, on gilled mushroom, 14.IX.2005, R.P. Webster, Photo 2008-92 (1 female, LFC); same locality data except in mixed forest, on gilled mushroom, 31.VIII.2006, R.P. Webster (1 male, RWC); Jackson Falls, "Bell Forest Preserve" (46.2199°N 67.7231°W), hardwood forest with hemlock, in gilled mushroom, 19.VII.2006, R.P. Webster (Photo 2008-91, 1 male, LFC; 1 female, RWC).

Gyrophaena gaudens Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W), mixed forest, on small gilled mushrooms on log, 19.VII.2006, R.P. Webster (Staph sp. 388, Photo 2008-93, 1 male, RWC); same locality data except in mixed forest, on polypore fungi, 31.VIII.2006, R.P. Webster (1 male, LFC; 1 male RWC); same locality data except in mixed forest, on gilled mushroom, 23.VI.2006, R.P. Webster (1 male, RWC); same locality data except mixed forest, on fleshy (gilled) fungi, 07.IX.2004, R.P. Webster (Photo 2008-107, 1 female, LFC); same locality except (46.1957°N 67.6803°W), mixed forest, on bracket fungi, 01.VIII.2004, R.P. Webster (1 female, 1 sex?, RWC); same locality data except in mixed forest, on *Pleurotus* sp. on dead standing *Populus tremuloides,* 03.VII.2006, R.P. Webster (Photo 2008-106, 1 male, LFC).

Gyrophaena gilvicollis Casey

CANADA. New Brunswick: Albert Co., Shepody N.W.A., Mary's Point Section (45.7260°N 64.6640°W), spruce forest, on decaying fleshy fungi, 12.IX.2004, R.P. Webster (Photo 2008-105, 1 female, LFC); **Carleton Co.**, Belleville, Meduxnekeag Valley Nature Preserve (46.1910°N 67.6740°W), mixed forest, on gilled mushroom, 13.IX.2006, R.P. Webster (2 males, LFC; Photo 2008-104, 1 male, LFC; 3 males, 2 females, RWC); same locality data except 31.VIII.2006, R.P. Webster (1 male, LFC; 1 male, 2 females, RWC); same locality except (46.1897°N 67.6710°W), mixed forest, on gilled mushroom, 12.IX.2008, R.P. Webster (GYR-RW-6, 1 male, LFC); same locality except (46.1907°N 67.6740°W), mixed forest, on fleshy (gilled) fungi,

07.IX.2004, R.P. Webster (1 sex?, LFC; 1 female, RWC); Jackson Falls, "Bell Forest Preserve" (46.2200°N 67.7230°W), hardwood forest, on gilled mushroom on log, 12.IX.2008, R.P. Webster (GYR-RW-28, 1 male, LFC); **Sunbury Co.**, Lakeville Corner (45.9007°N 66.2423°W), silver maple forest on ridge with oak, on gilled mushroom, 10.IX.2006, R.P. Webster (1 male, RWC); Maugerville, Portobello Creek N.W.A. (45.9031°N 66.4268°W), oak and red maple forest, on gilled mushroom, 11.IX.2006, R.P. Webster (7 males, RWC; Photo 2009-32, 1 male, LFC).

Gyrophaena gracilis Seevers

CANADA. New Brunswick: Carleton Co., Belleville Meduxnekeag Valley Nature Preserve (46.1942°N 67.6832°W), floodplain forest, on *Trametes hirsuta* on *Populus* log, 02.VI.2008, R.P. Webster, (5 sex?, RWC; GYR-RW-19, 1 sex?, RWC; GYR-RW-20, 1 sex?, RWC; GYR-RW-21, 1 sex?, RWC); **Sunbury Co.**, Lakeville Corner (45.9007°N 66.2423°W), silver maple swamp, on *Trametes hirsuta* on *Populus* log, 27.VIII. 2006 (1 male, 1 female, 1 sex?, LFC; 5 males, 2 females, 1 sex?, RWC; Photo 2008-35, 1 male, LFC); Burton, near Sunpoke Lake (45.7658°N 66.5546°W), oak forest, on partially dried *Pleurotus* sp. on dead standing trembling aspen, 20.VI.2007, R.P. Webster (1 female, RWC); **York Co.**, Keswick Ridge (46.0040°N 66.8776°W), barred owl nest box with small chicks, in moist nest material, 23.V.2006, S. Makepeace (1 female, RWC).

Gyrophaena illiana Seevers

CANADA. New Brunswick: Sunbury Co., Maugerville, Portobello Creek N.W.A. (45.9031°N 66.4268°W), red maple and oak forest, on polypore fungi on log 27.VIII.2006, R.P. Webster (Photo 2009-05, 1 male, RWC).

Gyrophaena insolens Casey

CANADA. New Brunswick: Albert Co., Mary's Point, white spruce forest, on *Russulla virescens,* 19.IX.1998, D.S. Christie (18 sex?, CGMC); **Carleton Co.**, Belleville, Meduxnekeag Valley Nature Preserve (46.1897°N 67.6710°W), mixed forest, on gilled mushroom 12.IX.2008, R.P. Webster (GYR-RW-7, 1 male, LFC); same locality except (46.1910°N 67.6740°W), mixed forest, on gilled mushroom, 13.IX.2006, R.P. Webster (1 male, 4 females, RWC); same locality and habitat data except 31.VIII.2006, R.P. Webster (2 males, 1 female, LFC; 2 males, 2 females, RWC; Photo 2009-01, 1 male, LFC; Photo 2009-02, 1 female, LFC); same locality except (46.1907°N 67.6740°W), mixed forest, on fleshy (gilled) fungi, 07.IX.2004, R.P. Webster (1 male, 1 sex?, LFC; 1 male, 1 female, RWC); same locality data except on gilled mushroom, 14.IX.2005, R.P. Webster (1 female, RWC); same locality except (46.1957°N 67.6803°W), mixed forest, in gilled mushroom, 15.IX.2004,

R.P. Webster (1 sex?, LFC; 1 sex?, RWC); **Charlotte Co.**, near New River (45.2135°N 66.6434°W), eastern white cedar swamp, on gilled mushroom, 22.IX.2006, R.P. Webster (1 male, 1 sex?, RWC); **Saint John Co.**, Dipper Harbour (45.1176°N 66.3806°W), red spruce forest, on gilled mushroom, 12.IX.2006, R.P. Webster (3 males, LFC; 1 male, RWC); Chance Harbour (45.1391°N 66.3696°W), yellow birch and spruce forest, on gilled mushroom on forest floor, 16.IX.2008, R.P. Webster (GYR-RW-76, 1 female, RWC; GYR-RW-72, 1 male, RWC; GYR-RW-75, 1 female, RWC); **Sunbury Co.**, Lakeville Corner (45.9007°N 66.2423°W), silver maple forest on ridge with oak, on gilled mushroom, 10.IX.2006, R.P. Webster (1 male, RWC); Maugerville, Portobello Creek N.W.A. (45.9031°N 66.4268°W), oak and red maple forest, on gilled mushroom, 11.IX.2006, R.P. Webster (2 males, LFC; 1 male, RWC); **York Co.**, Charters Settlement (45.8286°N 66.7365°W), mature mixed forest, on gilled mushroom on forest floor, 01.IX.2008, R.P. Webster (GYR-RW-53, 1 female, RWC); same locality data except 26.IX.2008, R.P. Webster (GYR-RW-62, 1 male, RWC; GYR-RW-63, 1 female, RWC; GYR-RW-64, 1 male, RWC; GYR-RW-65, 1 female, RWC; GYR-RW-67, 1 male, RWC).

Gyrophaena involuta Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1917°N 67.6740°W), mature mixed forest, on small gilled mushrooms on log, 8.VIII.2006, R.P. Webster (Photo 2008-79, 1 male, LFC; 5 males, 1 female, RWC); Jackson Falls, "Bell Forest" (46.2200°N 67.7230°W), hardwood forest, on *Pleurotus* sp. on log, 18.VIII.2008, R.P. Webster (GYR-RW-46, 1 male, RWC; GYR-RW-47, Photo 2009-25, 1 female LFC): same locality data except hardwood forest with hemlock, in gilled mushroom, 19.VII.2006 (1 male, RWC); **Sunbury Co.**, Acadia Research Forest, (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 17.VIII.2007, R.P. Webster (1 male, RWC; 1 male, 1 sex?, AFC); **York Co.**, Charters Settlement (45.8286°N 66.7365°W), mature mixed forest, on gilled mushroom, 6.VIII.2006, R.P. Webster (1 male, RWC).

Gyrophaena keeni Casey

CANADA. New Brunswick: Gloucester Co., near Black Rock (47.7411°N 65.2577°W), eastern white cedar swamp, in gilled fungi on rotting log, 08.VI.2006, R.P. Webster (Photo 2009-12, 1 male, RWC; 2 males, 1 female, 2 sex?, RWC); **Northumberland Co.**, 12 km SSE of Upper Napan (46.8991°N 65.3682°W), eastern white cedar swamp, in gilled mushroom, 07.VI.2006, R.P. Webster (Photo 2009-14, 1 female, LFC; 1 male, 1 female, RWC); **Sunbury Co.**, Acadia Research Forest (45.9816°N 66.3374°W), Road 7 regenerating forest, 8.5-year-old regenerating mixed forest, in gilled mushroom on stump, 18.VI.2007, R.P. Webster (1 male, AFC); same locality and forest type except in gilled mushroom, 18.VII.2007, R.P. Webster (2 males, AFC); same locality except

(45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, sifting moss near brook, 18.VI.2007, R.P. Webster (1 male, RWC); same locality and forest type except in gilled mushroom, 17.VIII.2007, R.P. Webster (2 males, AFC); **York Co.**, Charters Settlement (45.8286°N 66.7365°W), mature mixed forest, on polypore fungi on dead standing *Populus* sp., 24.VI.2006, R.P. Webster (Photo 2009-13, 1 male, LFC).

Gyrophaena laetula Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1940°N 67.6800°W), mixed forest, on *Pleurotus* sp. on dead standing *Populus tremuloides*, 3.VII.2006, R.P. Webster (1 male, RWC); same locality except (46.1883°N 67.6745°W), hardwood forest, in gilled fungi, 9.VIII.2005, M. Giguère & R.P. Webster (1 male, RWC); **Saint John Co.**, Chance Harbour (45.1391°N 66.3696°W), red spruce and yellow birch forest, on gilled mushroom, 24.VIII.2006, R.P. Webster (1 male, RWC); **Sunbury Co.**, Acadia Research Forest (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (1 male, AFC); same locality and habitat data except 17.VIII.2007, R.P. Webster (1 male, AFC); same locality except (46.0188°N 66.3765°W), Road 16 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (2 males, 1 sex?, AFC); **York Co.**, 14 km WSW of Tracy (45.6547°N 66.8611°W), forested black spruce bog with red maple, on gilled mushroom, 04.IX.2008, R.P. Webster (GYR-RW-11, Photo 2009-28, 1 male, LFC; GYR-RW-12, 1 sex?, RWC); Charters Settlement (45.8286°N 66.7365°W), mature mixed forest, on gilled mushroom on forest floor, 26.IX.2008, R.P. Webster (GYR-RW-68, Photo 2009-29, 1 female, LFC); same locality and habitat data except 19.VI.2006, R.P. Webster (2 males, 2 females, 1 sex?, RWC); same locality and habitat data except 6.VIII.2006, R.P. Webster, 1 male, RWC); same locality except (45.8430°N 66.7275°W), regenerating mixed forest, in gilled fungi, 8.VIII.2005, R.P. Webster (1 male, RWC).

Gyrophaena lobata Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1907°N 67.6740°W) mature mixed forest, on small white gilled mushroom on side of decaying log, 19.VII.2006, R.P. Webster (2 males, RWC; Photo 2008-87, 1 female, LFC); same locality data except in mixed forest, on gilled mushroom, 31.VIII.2006, R.P. Webster (Photo 2008-86, 1 male, LFC; 1 male, 5 females, RWC).

Gyrophaena modesta Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1897°N 67.6710°W), mixed forest, on gilled mushroom, 12.IX.2008,

R.P. Webster (GYR-RW-5, 1 male, RWC; GYR-RW-9, 1 male, LFC); same locality except (46.1910°N 67.6740°W), mixed forest, on gilled mushroom, 31.VIII. 2006, R.P. Webster (1 male, LFC; 2 males, RWC); same locality and habitat data except 13.IX.2006, R.P. Webster (3 males, RWC); Hartland, Becaguimec Island (46.3106°N 67.5392°W), hardwood forest, on *Pleurotus* sp. on log, 16.IX. 2006, R. Capozi & R.P. Webster (1 male, RWC); Jackson Falls, "Bell Forest Preserve" (46.2200°N 67.7230°W), hardwood forest, on gilled mushroom on log, 12.IX.2008, R.P. Webster (GYR-RW-29, 1 male, RWC; GYR-RW-32, 1 male, RWC; GYR-RW-34, 1 male LFC); **Saint John Co.**, Dipper Harbour (45.1176°N 66.3806°W), red spruce forest, on gilled mushroom, 12.IX.2006, R.P. Webster (1 male, LFC; 6 males, RWC); Chance Harbour (45.1391°N 66.3696°W), red spruce and birch forest, on gilled mushroom, 24.VIII.2006, R.P. Webster (1 male, LFC); **Sunbury Co.**, Maugerville, Portobello Creek N.W.A. (45.9031°N 66.4268°W), oak and red maple forest, on gilled mushroom, 11.IX.2006, R.P. Webster (2 males, LFC; 2 males, RWC); Acadia Research Forest (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 17.VIII.2007, R.P. Webster (1 male, AFC); **York Co.**, Charters Settlement (45.8286°N 66.7365°W) mature red spruce and cedar forest, in decaying mushrooms, 04.X.2005, R.P. Webster (1 male, RWC; Photo 2008-90, 1 male, LFC); same locality data except on gilled mushroom on forest floor, 26.IX. 2008, R.P. Webster (GYR-RW-66, 1 male, RWC).

***Gyrophaena sculptipennis* Casey**

CANADA. New Brunswick: Carleton Co., Hartland, Becaguimec Island (46.3106°N 67.5392°W), hardwood forest, on *Pleurotus* sp. on log, 16.IX. 2006, R. Capozi & R.P. Webster (1 sex?, RWC); **Sunbury Co.**, Maugerville, Portobello Creek N.W.A. (45.9031°N 66.4268°W), oak and red maple forest, on gilled mushroom, 11.IX.2006, R.P. Webster (Photo 2009-03, 1 male, LFC; 2 males, 2 females, 1 sex?, RWC); Acadia Research Forest (46.0188°N 66.3765°W), Road 16 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (1 male, AFC); same locality except (45.9816°N 66.3374°W), Road 7 regenerating forest, 8.5-year-old regenerating mixed forest, in gilled mushroom on stump, 18.VI.2007, R.P. Webster (1 sex?, AFC); same locality except (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (1 sex?, AFC); same locality and habitat data except 17.VIII.2007, R.P. Webster (1 sex?, AFC); same locality and habitat data except 18.IX.2007, R.P. Webster (1 sex?, AFC); **York Co.**, Charters Settlement (45.8300°N 66.7347°W), regenerating mixed forest, on gilled mushroom, 29.VII.2004, R.P. Webster (1 female, RWC); same locality except (45.8286°N 66.7365°W), mature mixed forest, on gilled mushroom on forest floor, 11.VII.2006, R.P. Webster (1 female, RWC); same locality and habitat data except 8.VIII.2006, R.P. Webster (1 male, RWC); same locality and habitat data except 26.IX.2008, R.P. Webster (GYR-RW-69, 1 male, RWC).

***Eumicrota socia* (Erichson)**

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1877°N 67.6717°W), hardwood forest, in *Climacodon septentrionale* on dead standing sugar maple, 02.IX.2008, R.P. Webster (GYR-RW-55, 1 male, RWC; GYR-RW-48, 1 male, LFC; GYR-RW-57, 1 sex?, RWC); same locality except (46.1889°N 67.6764°W), floodplain forest, on gilled mushroom on rotten log, 02.VI.2008, R.P. Webster (GYR-RW-15, 1 female, RWC); same locality except (46.1890°N 67.6766°W), flood plain forest with butternut, on bracket fungi, 08.VII.2005, R.P. Webster (Photo 2008-88, 1 male, LFC; 1 sex?, RWC); same locality except (46.1917°N 67.6740°W), mixed forest, in slightly decayed polypore fungus on log, 08.VIII.2006, R.P. Webster (1 female, RWC); same locality except (46.1883°N 67.6745°W), hardwood forest, on partially dried *Pleurotus* sp. on dead standing sugar maple, 9.VIII.2005, M.A. Giguère & R.P. Webster (2 males, 1 female); same locality except (46.1907°N 67.6740°W), mixed forest, on gilled mushroom, 14.IX.2005, R.P. Webster (1 female, RWC); same locality except (46.1957°N 67.6803°W), mixed forest, on bracket fungi, 13.VII.2004, K. Bredin, J. Edsall, & R.P. Webster (1 female, RWC); Jackson Falls, "Bell Forest Preserve" (46.2200°N 67.7230°W), hardwood forest, on gilled mushroom on log, 12.IX.2008, R.P. Webster (GYR-RW-31, 1 sex?, RWC; GYR-RW-43, 1 female, RWC); same locality data except on *Pleurotus* sp. on log, 18.VIII.2008, R.P. Webster (GYR-RW-58, 1 male, RWC; GYR-RW-59, 1 female, LFC; GYR-RW-60, 1 female, RWC); Hartland, Becaguimec Island (46.3106°N 67.5392°W), hardwood forest, on *Pleurotus* sp. on log, 16.IX. 2006, R. Capozi & R.P. Webster (1 female, RWC); Richmond, Hovey Hill Protected Area (46.1115°N 67.7770°W), hardwood forest, on fleshy fungi on log, 19.VIII.2004, R.P. Webster (1 female, RWC); **Sunbury Co.**, Maugerville, Portobello Creek N.W.A. (45.8992°N 66.4248°W), silver maple forest, margin of slow river under litter on muddy soil, 16.VII.2004, R.P. Webster (Photo 2008-89, 1 female, LFC); Photo 2009-11, 1 male, LFC); Acadia Research Forest (46.0188°N 66.3765°W), Road 16 control, mature red spruce and red maple forest, in decaying polypore fungi on dead standing spruce, 17.VIII.2007, R.P. Webster (1 female, AFC); near Sunpoke Lake (45.7658°N 66.5546°W), oak forest, on partially dried *Pleurotus* sp. on dead standing trembling aspen, 20.VI.2007, R.P. Webster (1 male, RWC); **York Co.**, Charters Settlement (45.8286°N 66.7365°W), mature mixed forest, on gilled mushroom on forest floor, 01.IX.2008, R.P. Webster (GYR-RW-54, 1 female, RWC); same locality and habitat data except 24.VI.2006, R.P. Webster (1 male, 1 female, RWC).

***Gyrophaena subnitens* Casey**

CANADA. New Brunswick: Sunbury Co., Acadia Research Forest (46.0173°N 66.3741°W), Road 16 regenerating forest, 8.5-year-old regenerating mixed forest, in gilled mushroom on (sun-exposed) stump, 18.VI.2007, R.P. Webster (7 males, 5 females, RWC; Photo 2009-06, 1 male, LFC); Photo 2009-07, 1 female, LFC).

Gyrophaena uteana Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1957°N 67.6803°W), mixed forest, on bracket fungi, 01.VIII.2004, R.P. Webster (1 male, LFC); same locality (46.1907°N 67.6740°W), mixed forest on gilled mushroom, 23.VI.2006, R.P. Webster (3 males, RWC). **Sunbury Co.**, Lakeville Corner (45.9007°N 66.2423°W), silver maple swamp on ridge with oaks, on gilled mushroom, 14.IX.2006, R.P. Webster (1 male, RWC); Acadia Research Forest (46.0173°N 66.3741°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 17.VIII.2007, R.P. Webster (2 males, AFC; 1 male, RWC).

Gyrophaena vitrina Casey

CANADA. New Brunswick: Carleton Co., Belleville, Meduxnekeag Valley Nature Preserve (46.1889°N 67.6764°W), floodplain forest, on gilled mushroom on rotten log, 02.VI.2008, R.P. Webster (GYR-RW-14, 1 male, RWC; same locality and habitat data except 8.VIII.2006 (1 female, RWC); same locality except (46.1942°N 67.6832°W), floodplain forest, on *Trametes hirsuta* on *Populus* log, 02.VI.2008, R.P. Webster (GYR-RW-16, 1 male, RWC); same locality except (46.1897°N 67.6710°W), mixed forest, on gilled mushroom, 12.IX.2008, R.P. Webster (GYR-RW-3, 1 female, RWC; GYR-RW-4, 1 male, RWC; GYR-RW-10, 1 sex?, LFC); same locality except (46.1907°N 67.6740°W), hardwood forest, on gilled mushroom, 8.VIII.2006, R.P. Webster (1 male, LFC); same locality data except in hardwood forest, on small gilled fungi on side of log, 8.VIII.2006, R.P. Webster (Photo 2008-80, 1 male, LFC); same locality except (46.1957°N 67.6803°W), mixed forest, on bracket fungi, 01.VIII.2004, R.P. Webster (1 female, LFC; 1 male, AFC); same locality data except in mixed forest on bracket fungi, 13.VII.2004, K. Bredin, J. Edsall & R.P. Webster (1 female, RWC); same locality except (46.1940°N 67.6801°W), rich Appalachian hardwood forest, in fleshy fungi in various stages of decay, 12.VIII.2004, R.P. Webster (1 female, RWC) **Gloucester Co.**, near Black Rock (47.7411°N 65.2577°W), eastern white cedar swamp, in gilled fungi on rotting log, 08.VI.2006, R.P. Webster (3 males, RWC); **Restigouche Co.**, 9 km S of Saint-Arthur (47.8177°N 66.7561°W), eastern white cedar swamp, on gilled mushroom, 14.VI.2006, R.P. Webster (2 males, 1 female, 2 sex?, RWC); **Sunbury Co.**, Acadia Research Forest (45.9799°N 66.3394°W), Road 7 control, mature red spruce and red maple forest, in gilled mushroom, 18.VII.2007, R.P. Webster (1 sex?, AFC); same locality and habitat data except 17.VIII.2007, R.P. Webster (1 sex?, AFC; 1 male, RWC).